241

PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

CONTENTS

TRADE NAME	MODEL	SET AND FOLDER No.
Airline	35WG-2767A	241-2
Airline	61-12601	241-3
Cavalier	5AT1	241-4
David Bogen	RP-1, RP-1L	241-5
Dumont	RA-306, RA-307 Tel. Rec.	241-6
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Firestone	13-G-155 Tel. Rec.	241-8
General Electric	431, 432	241-9
Kaye-Halbert	104, 114, 122, 124, 138, 144, 145, 146, 154, 164, 174, 314, 322, 324, 338, 344, 354, 356, 385, 426 (Ch. F243) Tel. Rec., Prod. Chg. Bul. 96	241-1
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Westinghouse	H-795T27, H-795TU27, H-815T24, H-815TU24, H-817K24, H-817KU24 (Ch. V-2250-1) Tel. Rec.	241-12
Zenith	L677E, R (Ch. 6L20)	241-13

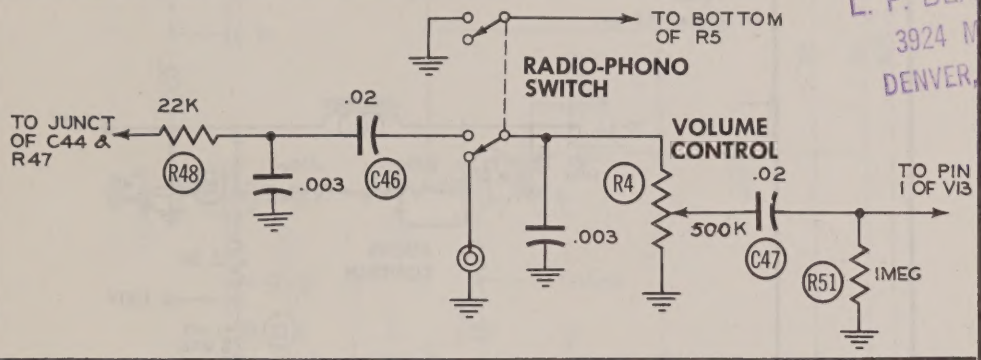
SUPPLEMENTAL DATA TO PHOTOFACT FOLDER 9 IN SET 169

Ch. F-243

Kaye-Halbert chassis F-243 is similar to chassis 243, covered in Photofact Folder 9, Set 169. A list of the differences is given below:

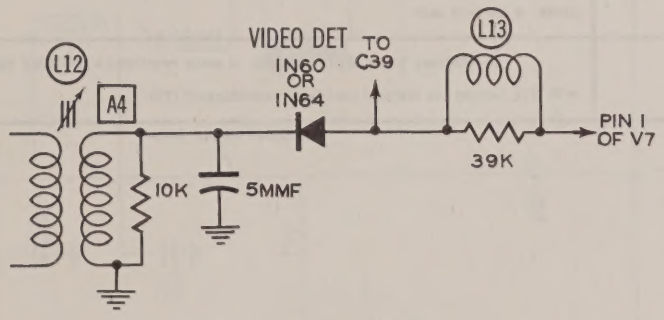
PHONO SWITCH AND JACK ADDED

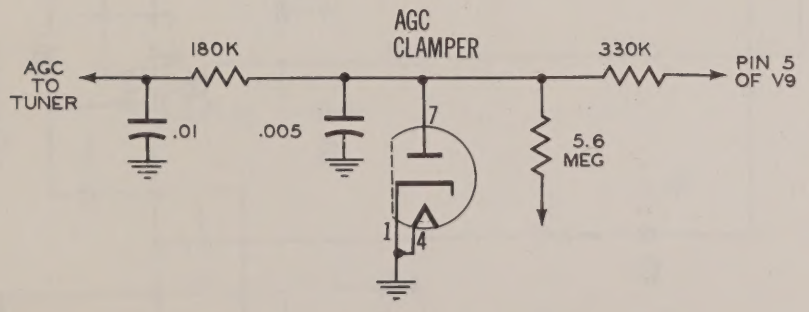
A phono switch was added to the chassis. A partial schematic showing this circuit is given below. When the phono switch is used the ground is disconnected from the brightness control (R5) and it is connected to ground through the phono switch.



DELAYED AGC ADDED

The video detector was changed to a 1N60 or 1N64 diode and the $\frac{1}{2}$ of a 6AL5, formerly used as video detector is used as an AGC clamper. Partial schematic of these two new circuits are given below:





KAYE-HALBERT MODELS 104, 114, 122, 124, 138, 144, 145, 146, 154, 164, 314, 322, 324, 338, 344, 354, 356, 385, 426 (Ch. F-243)

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(Continued on next page.)

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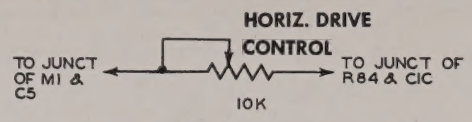
HORIZONTAL DRIVE CONTROL ADDED

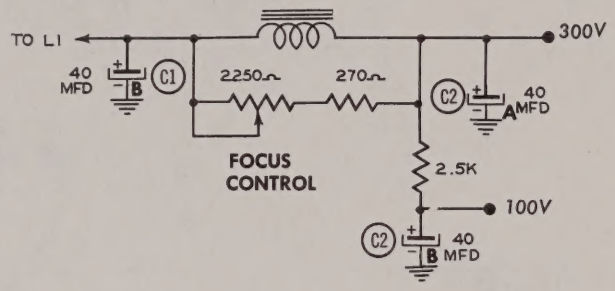
A 10KΩ potentiometer (part #M-128B) was added to the chassis in place of the resistors R87, R88 and R89 as shown below.



ELECTROMAGNETIC FOCUS PICTURE TUBE USED

An electromagnetic focus picture tube is used in Ch. F-243. A 21EP4A tube is used in Models 114 and 314, a 24AP4A tube is used in Model 426 and all other models use a 21ZP4A tube.

When the electromagnetic focus picture tube is used, a focus coil (part #H-3108), a focus control (part #M-112A) and 270KΩ, 2 watt resistor were added in place of R99. A partial schematic of this new circuit is given below.



CASCODE TUNER INCORPORATED

A cascode tuner (part #K-530A) is used. When the cascode tuner is used, L8, at the input of V3, was changed to a 3.6 to 8.8 microhenry coil and is tuned to 21.5MC. A schematic of this tuner is given on the next page.

In addition, to the above changes, in some receivers a 1500MMF capacitor is added in parallel with R71, across the vertical oscillator transformer (T2).

(Continued on next page.)

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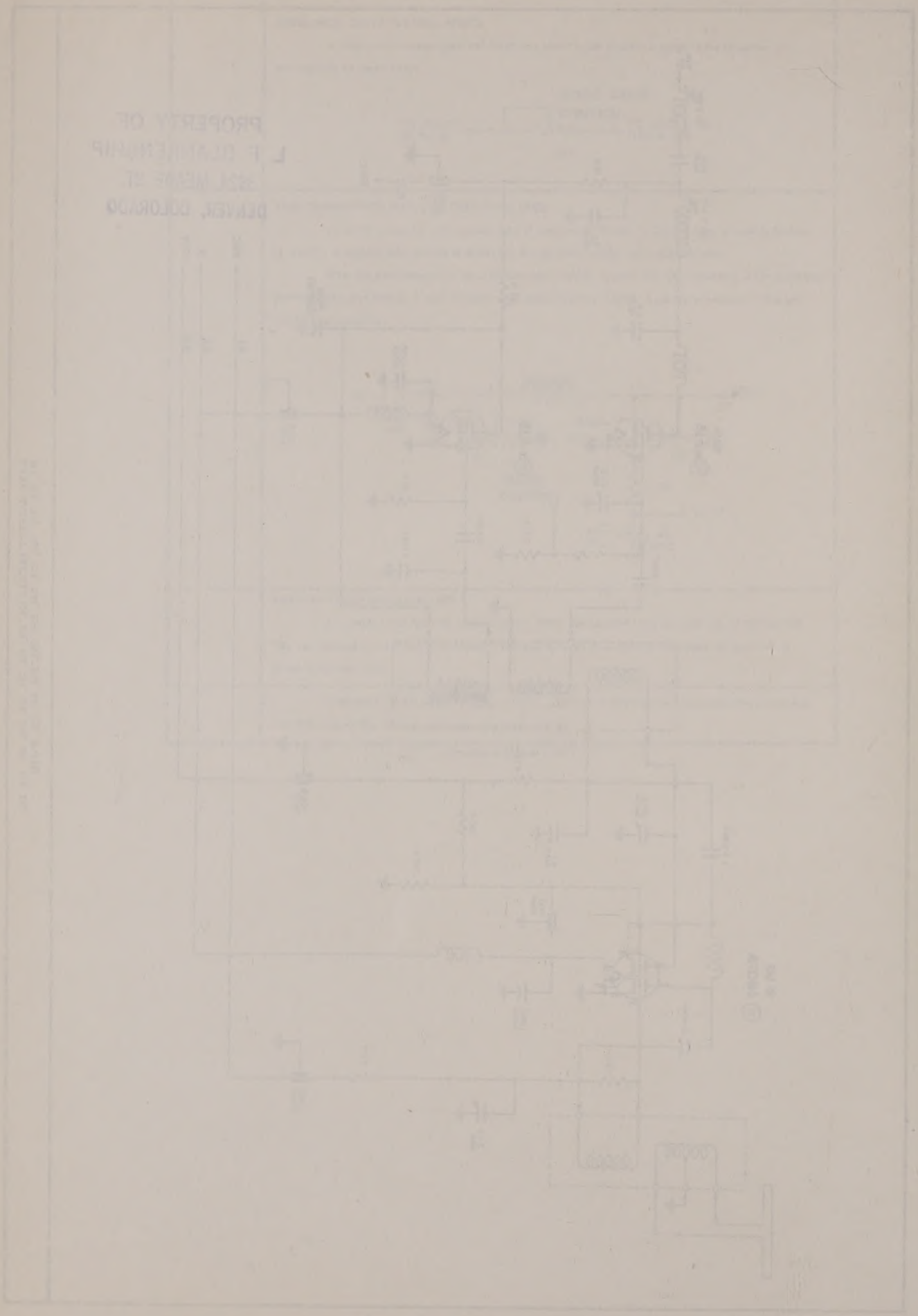
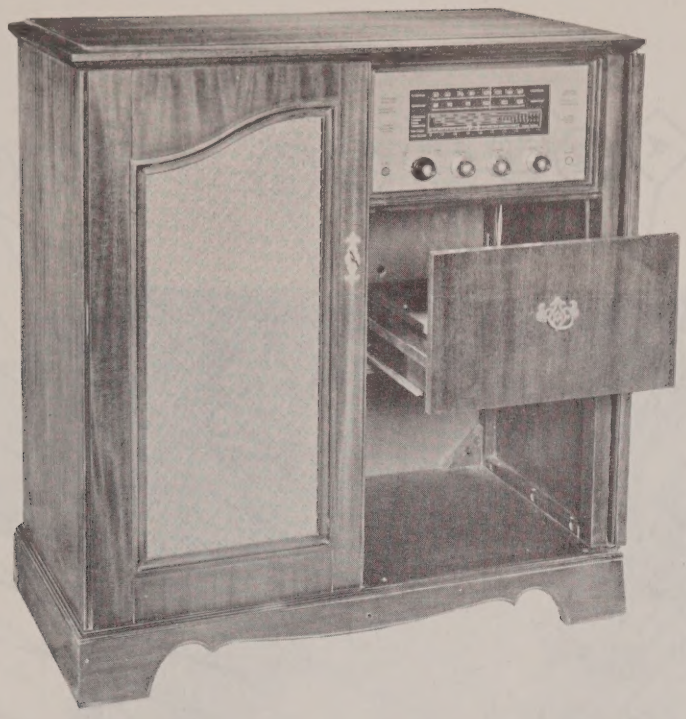
KAYE-HALBERT MODELS 104, 114, 122, 124, 138, 144, 145, 146, 154, 164, 314, 322, 324, 338, 344, 354, 356, 385, 426 (Ch. F-243)



PROPERTY OF
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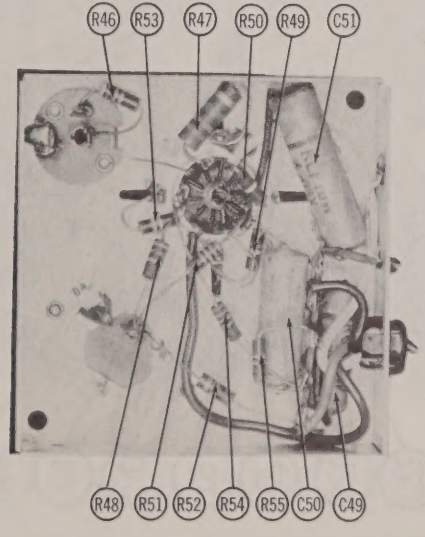
3924 MEADE ST.
DENVER, COLORADO

AIRLINE
MODEL 35WG-2767A

AIRLINE
MODEL 35WG-2767A

TRADE NAME	Airline Model 35WG-2767A	
SUPPLIER	Montgomery Ward & Co., 619 Chicago Ave., Chicago, Ill.	
TYPE SET	AC Operated AM-FM-Phono Combination Receiver with 3 Speed Automatic Record Changer	
TUBES	Twelve	
POWER SUPPLY	105-125 Volts AC-60 Cycles	RATING .21 Amp. @ 117 Volts AC
TUNING RANGE - BROADCAST	535-1620KC	FREQ. MOD. 88-108MC

RECORD CHANGER UNIT - AIRLINE MODEL V-28A193



PHONO PRE-AMP-BOTTOM VIEW

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

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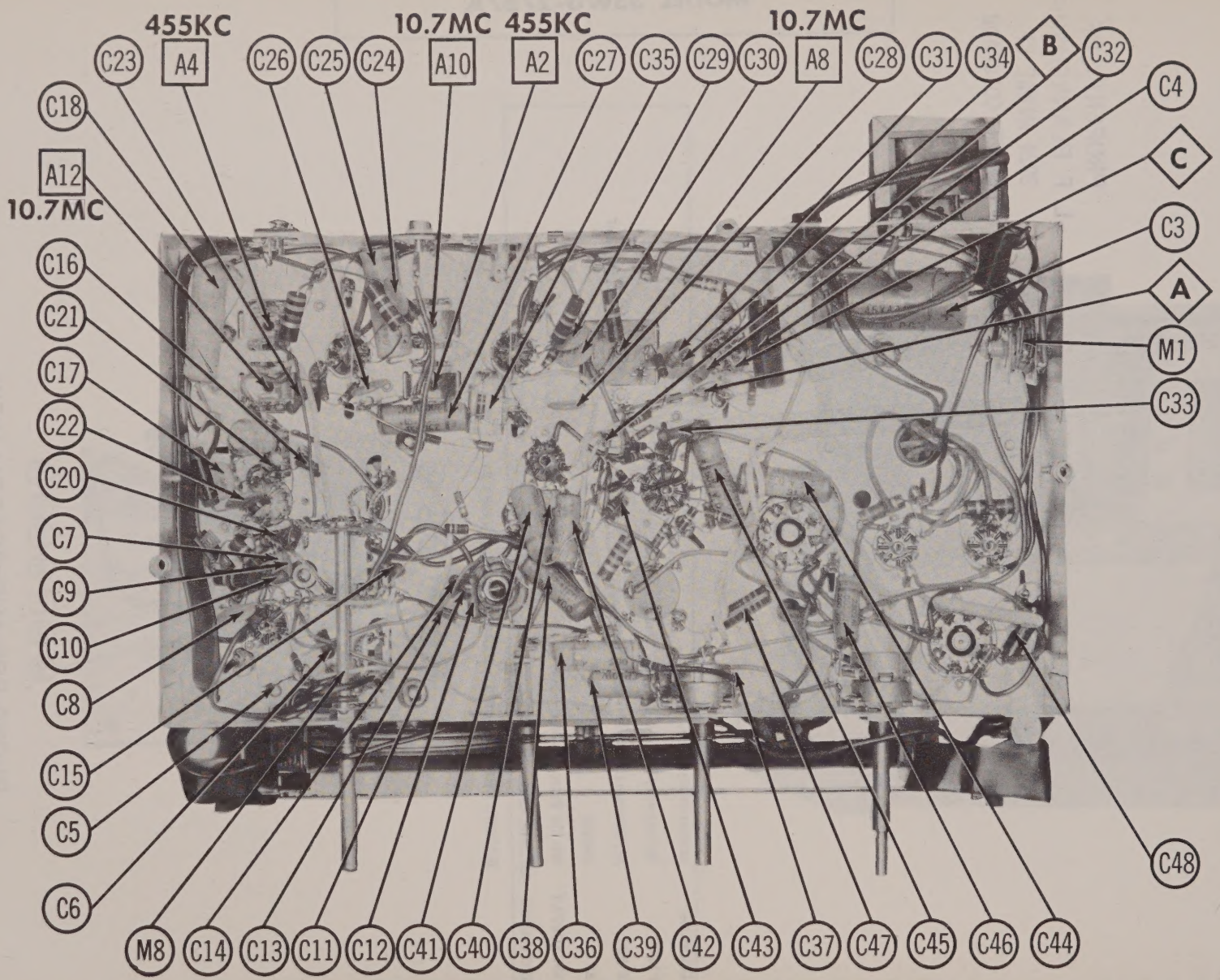
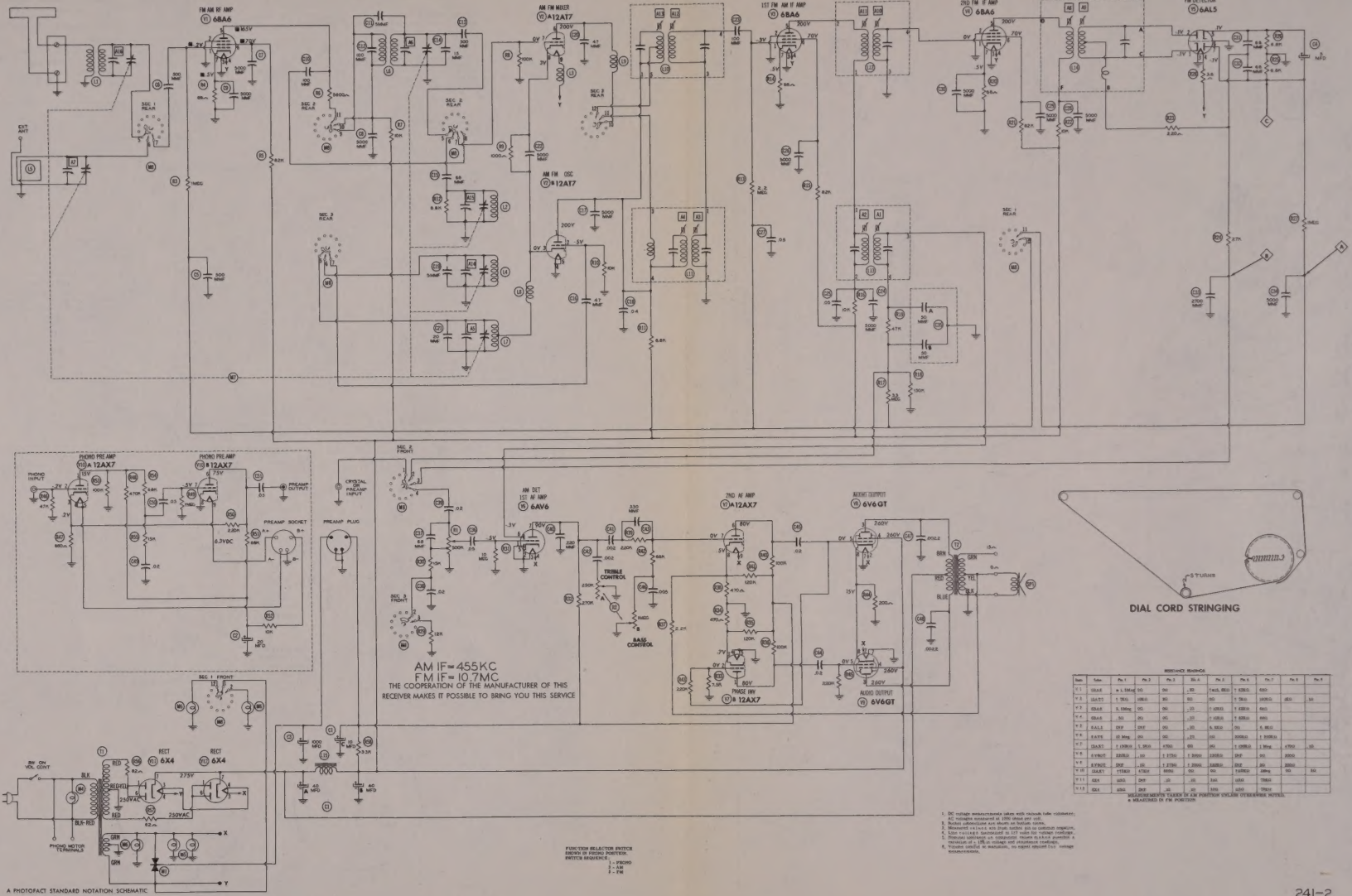
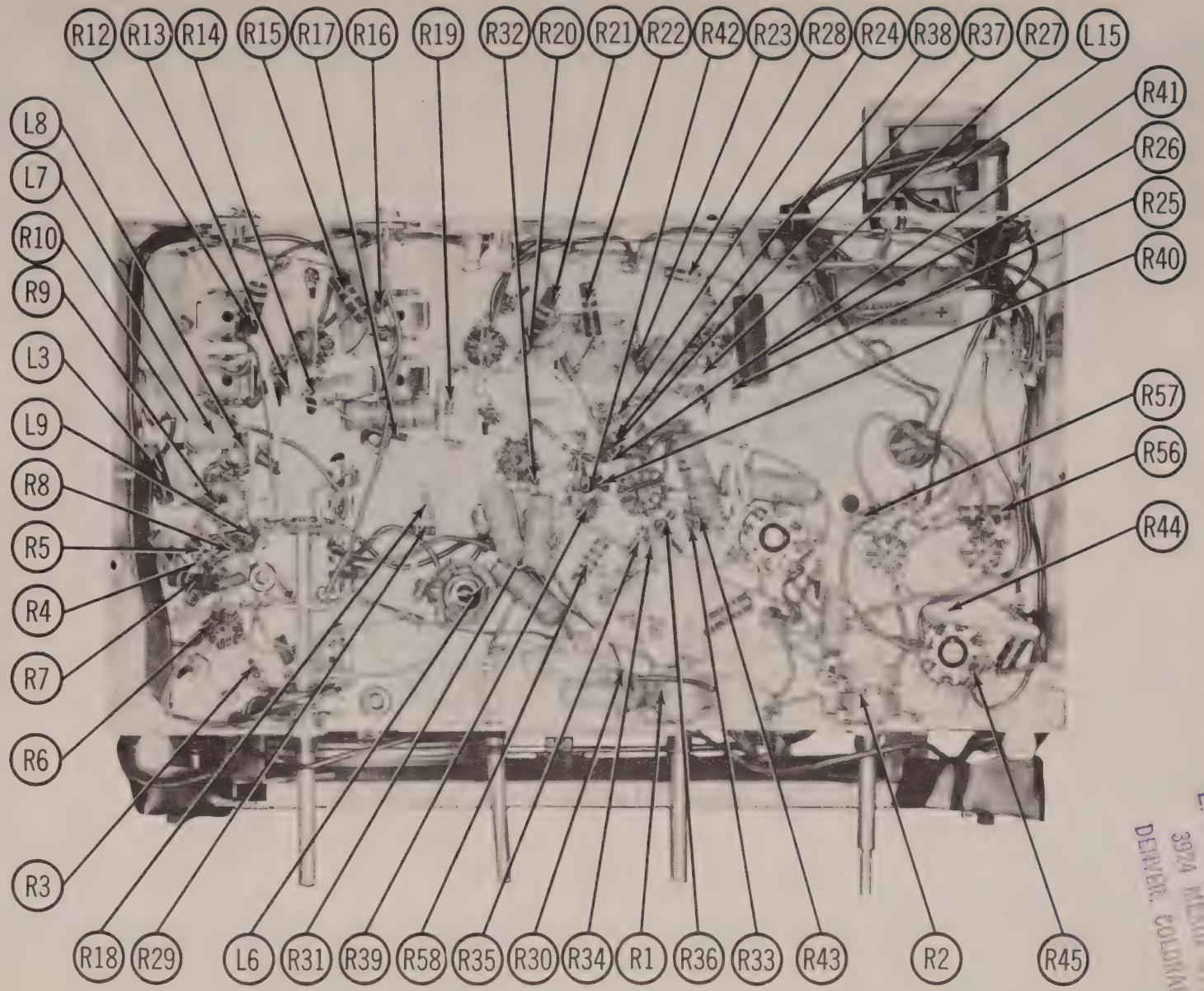


CHASSIS BOTTOM VIEW-CAPACITOR IDENTIFICATION


FM AM RF AMP V1 6BA6
AM FM MIXER V2 12AT7
1ST FM AM IF AMP V3 6BA6
2ND FM IF AMP V4 6BA6
FM DETECTOR V5 6AL5
AM FM OSC V7 12AT7
PHONO PREAMP V10 A 12AX7
PHONO PREAMP V10 B 12AX7
AM DET 1ST AF AMP V9 6AV6
2ND AF AMP V7 A 12AX7
PHASE INV V7 B 12AX7
AUDIO OUTPUT V8 6V6GT
AUDIO OUTPUT V8 6V6GT
RECT V11 6X4
RECT V12 6X4
EXT ANT
PHONO INPUT
PREAMP OUTPUT
PREAMP SOCKET
PREAMP PLUG
CRYSTAL OR PREAMP INPUT
TREBLE CONTROL
BASS CONTROL
PHONO MOTOR TERMINALS
AM IF=455KC
FM IF=10.7MC
THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE
DIAL CORD STRINGING
5 TURNS
A PHOTOFACT STANDARD NOTATION SCHEMATIC
©Howard W. Sams & Co., Inc. 1954
241-2



CHASSIS BOTTOM VIEW-RESISTOR IDENTIFICATION

PROPERTY OF
L. F. BLANKENSHIP
3924 KEARNEY ST.
DENVER, COLORADO

AIRLINE
MODEL 35WG-2767A

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

To set pointer, turn tuning capacitor fully closed and set pointer to last reference mark at low frequency end of dial. Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

AM ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.1MFD	High side to pin 7 (grid) of 12AT7 (V2). Low side to chassis.	455KC (400∿Mod)	AM	Tuning gang fully open	Across voice coil	A1, A2, A3, A4	Adjust for maximum output.
2.	200MMF	High side to external antenna terminal. Low side to chassis.	1620KC	"	"	"	A5	"
3.	"	"	1400 KC	"	Tune to 1400KC signal	"	A6, A7	"

FM IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
4.	.01MFD	High side to pin 1 (grid) of 6BA6 (V4). Low side to chassis.	10.7MC (Unmod)	FM	Tuning gang fully open	DC probe to point Ⓐ. Common to chassis.	A8	Adjust signal generator for 0.1 Volt input signal. Adjust A8 for maximum deflection.
5.	"	"	"	"	"	DC probe to point Ⓑ. Common to chassis.	A9	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.
6.	"	High side to pin 1 (grid) of 6BA6 (V3). Low side to chassis.	"	"	"	DC probe to point A. Common to chassis.	A10, A11	When adjusting A10 shunt 1KΩ resistor across primary. Move 1KΩ across secondary before adjusting A11. Adjust A10 and A11 for maximum deflection. Reduce generator input signal to 10,000 microvolts and retouch A8 for maximum deflection.
7.	"	"	"	"	"	DC probe to point Ⓑ. Common to chassis.	A9	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.
8.	"	High side to FM antenna stator lug on tuning gang. Low side to chassis.	"	"	"	DC probe to point Ⓓ. Common to chassis.	A12, A13	Use 10,000 microvolts input signal. Shunt 1KΩ resistor across primary, then adjust A12. Move shunt across secondary and adjust A13. Adjust A12 and A13 for maximum deflection. Remove 1000Ω shunt resistor.

FM IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use frequency modulated signal with 60∿ modulation and 450KC sweep. Use 120∿ sawtooth voltage in scope for horizontal deflection.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT SCOPE	ADJUST	REMARKS
4.	.01MFD	High side to Pin 1 (grid) of 6BA6 (V3). Low side to chassis.	10.7MC (450KC Swp)	FM	Tuning gang fully open	Vert. amp. to point Ⓒ. Low side to chassis.	A8, A10, A11	Disconnect stabilizing capacitor C4. Adjust for curve of maximum amplitude and symmetry similar to Fig. 1
5.	"	High side to FM antenna stator lug on tuning gang. Low side to chassis.	"	"	"	"	A12, A13	"
6.	"	"	"	"	"	Vert. amp. to point Ⓑ. Low side to chassis.	A9	Reconnect stabilizing capacitor C4. Adjust so that 10.7MC occurs at center of crossover lines, as in Fig. 2. SLIGHTLY retouch A8 for maximum amplitude and straightness of crossover lines. Continue alignment with step 9.

FM RF ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
9.	300Ω carbon resistors	Across FM antenna terminals (disconnect dipole)	108.4MC (Unmod)	FM	Tuning gang fully open	DC Probe to point Ⓐ. Common to chassis.	A14	Adjust for maximum deflection.
10.	"	"	104.5MC (Unmod)	"	Tune to 104.5MC Signal (Max deflection on VTVM)	" "	A15	"
11.	"	"	"	"	"	"	A16	Adjust for maximum deflection. Repeat steps 9, 10 and 11

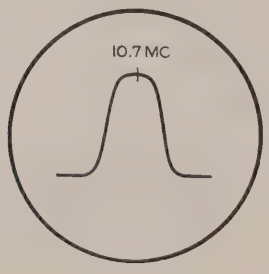


FIG. 1

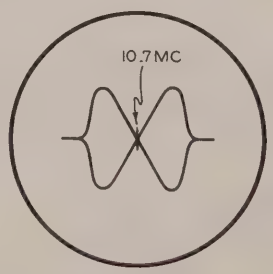


FIG. 2

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA		RETMA BASE TYPE	NOTES
		AIRLINE PART No.	STANDARD REPLACEMENT		
V1	FM-AM-RF-Amp.	6BA6	6BA6	7BK	
V2	FM-AM-Mixer-Osc.	12AT7	12AT7	9A	
V3	1st FM-AM-IF-Amp.	6BA6	6BA6	7BK	
V4	2nd-FM-IF-Amp.	6BA6	6BA6	7BK	
V5	Detector	6AL5	6AL5	6BT	
V6	1st AF-Amplifier	6AV6	6AV6	7BT	
V7	2nd AF-Amplifier Phase Inverter	12AX7	12AX7	9A	
V8	Audio Output	6V6GT	6V6GT	7S	
V9	Audio Output	6V6GT	6V6GT	7S	
V10	Phono Pre Amp.	12AX7	12AX7	9A	
V11	Rectifier	6X4	6X4	5BS	
V12	Rectifier	6X4	6X4	5BS	

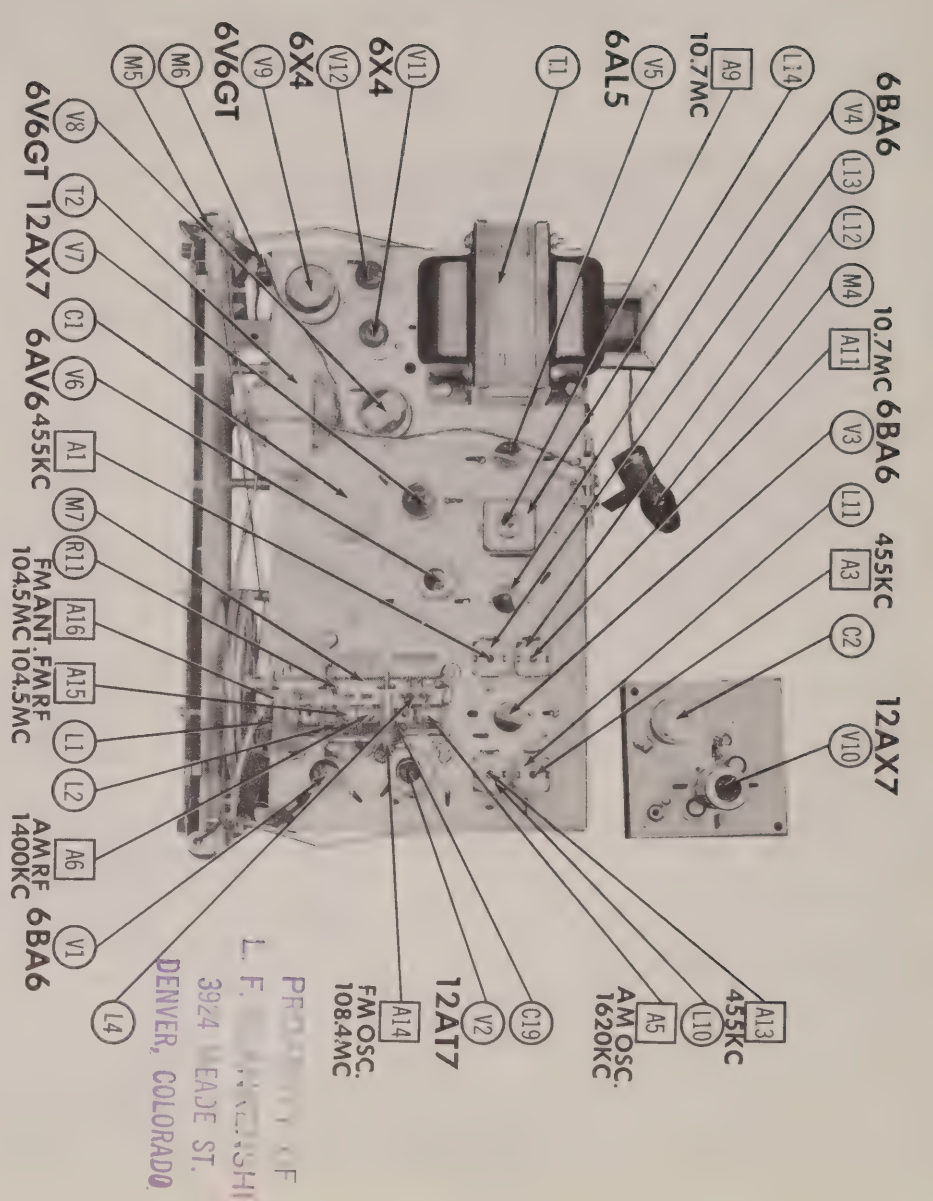
CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	AIRLINE PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C1A	▰40	400	45X403	AFH3-43		C034		FP376.8	TVL-3785	
B	■40	400								
C	▲10	400								
C2	20	250		AFH1-45		A046		FP144	TVL-1509	
C3	1000	10	45X404	PRS1000/12		BRH1210		TC1505 TC1505	TVA-1163	
C4	5	100	45X361	PRS150/4		BR415		TC40	TVA-1402	
C5	500			SI500	D6-501	TP47	GP2K-501	UC-535	5GA-T5	
C6	500			SI500	D6-501	TP47	GP2K-501	UC-535	5GA-T5	
C7	5000			BPD-005	DD-502	K080	801-005	DC-525	5HK-D5	
C8	5000			BPD-005	DD-502	K080	801-005	DC-525	5HK-D5	
C9	5000			BPD-005	DD-502	K080	801-005	DC-525	5HK-D5	
C10	100			SI100	D6-101	TP34	GP1K-101	UC-531	5GA-T1	
C11	5		47X549	SI5NP0	TCZ-4.7	TZ07	NP0K-050	ZT-5547	5TCUB-V5	
C12	100			SI100N750	TCN-100	TN22	N750L-101	NT-531	5TCU-T1	
C13	500			SI500	D6-501	TP47	GP2K-501	UC-535	5GA-D5	
C14	15			SI5N750	TCN-15	TN03			5TCU-Q15	
C15	68			SI68	D6-680	TP32	GP1K-680	UC-5468	5GA-Q68	
C16	47			SI47NP0	TCZ-47	TP16	NP0L-470		5TCC-Q47	
C17	5000			BPD-005	DD-502	K080	801-005	DC-525	5HK-D5	
C18	.04	600	RCP10W6403M	P688-04		CUB6S4		PT614	6TM-S4	
C19	5		47X549	SI5NP0	D6-050	TP06	GP1K-050	NT-555	5GA-V5	
C20	47			SI47NP0	TCZ-47	TP16	NP0L-470		5TCC-Q47	
C21	20			SI20	D6-200	TZ13	GP1K-200	ZT-542	5GA-Q2	
C22	5000			BPD-005	DD-502	K080	801-005	DC-525	5HK-D5	
C23	100			SI100	D6-101	TP34	GP1K-101	UC-531	5GA-T1	
C24	5000			BPD-005	DD-502	K080	801-005	DC-525	5HK-D5	
C25	.04	600	RCP10W6403M	P688-04		CUB6S4		PT614	6TM-S4	
C26	5000			BPD-005	DD-502	K080	801-005	DC-525	5HK-D5	
C27	.05	200		P288-05	DF-503	PJ2S5		PT415	2TM-S5	
C28	5000			BPD-005	DD-502	K080	801-005	DC-525	5HK-D5	
C29	5000			BPD-005	DD-502	K080	801-005	DC-525	5HK-D5	
C30	5000			BPD-005	DD-502	K080	801-005	DC-525	5HK-D5	
C31	68			SI68N750	TCN-68	TN18	N750L-680		5TCU-Q68	
C32	68			SI68N750	TCN-68	TN18	N750L-680		5TCU-Q68	
C33	2700		47X575	SI2700	DD-272	TP59	GP2-333-272	UC-5227	5GA-D27	
C34	5000			BPD-005	DD-502	K080	801-005	DC-525	5HK-D5	
C35A	50		47X112	SI50	D6-500	TP30	GP1K-500	UC-545	5GA-Q5	Note 1
B	50			SI50	D6-500	TP30	GP1K-500	UC-545	5GA-Q5	Note 1
C36C	.05	200		P288-05	DF-503	PJ2S5		PT415	2TM-S5	
C37	68	500				22R5Q68		MCB-230	MS-47	
C38	.02	200		P288-05	DF-503	PJ2S5		PT415	2TM-S5	
C39	.02	200		P288-05	DF-503	PJ2S5		PT415	2TM-S5	
C40	220	500		1479-00025		22R5T22		MCB-240	1FM-325	
C41	.002	600		P688-002	D6-202	CUB6D2		PT622	6TM-D2	
C42	.002	600		P688-002	D6-202	CUB6D2		PT622	6TM-D2	
C43	330		47X624	SI330	D6-331	TP43	GP2K-331	UC-5333	5GA-T33	
C44	.02	600		P688-02		CUB6S2		PT612	6TM-S2	

(CONT'D ON NEXT PAGE)

CHASSIS—TOP VIEW



PROPERTY OF
L. F. [illegible]
3924 EAJE ST.
DENVER, COLORADO

PARTS LIST AND DESCRIPTIONS (Continued)

CAPACITORS (cont)

ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA AIRLINE PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C45	.02	600		P688-02		CUB6S2		PT612	6TM-S2	
C46	.005	200		P688-005	D6-502	CUB6D5		PT625	6TM-D5	
C47	.0022	1000		P1088-0022		CUB16D22		PT1622	MB-D2	
C48	.0022	1000		P1088-0022		CUB16D22		PT1622	MB-D2	
C49	.02	600		P688-02		CUB6S2		PT612	6TM-S2	
C50	.05	200		P288-05	DF-503	PJ2S5		PT415	2TM-S5	
C51	.05	400		P488-05	DF-503	CUB4S5		PT415	4TM-S5	

Note 1. Items C35A and C35B are combined in one unit.

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA AIRLINE PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	500KΩ	½	36X390	Q13-133X				Volume tapped at 100K
B	Switch		Not Req.	76-1				Attach to R1A
R2A	250KΩ	½	B78X16-B	* QJ-534				Treble-Panel
B	1 Meg	½	Not Req.					Bass-Rear

* CONCENTRIKIT EQUIVALENT: KIT K-2, BASE ELEMENTS & SHAFTS: B13-130 & P6-125 (Panel) B17-137 & R9-214 (Rear)

RESISTORS

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA AIRLINE PART No.	IRC PART No.	NOTES
R3	1 Meg	½		BTS-1 Meg	
R4	68Ω	½		BTS-68	
R5	82KΩ	1		BTA-82K	
R6	5600Ω	½		BTS-5600	
R7	10KΩ	1		BTA-10K	
R8	100KΩ	½		BTS-100K	
R9	1000Ω	½		BTS-1000	
R10	10KΩ	½		BTS-10K	
R11	6800Ω	½		BTS-6800	
R12	6800Ω	2		BTB-6800	
R13	2. 2 Meg	2		BTB-2. 2Meg	
R14	68Ω	2		BTB-68	
R15	82KΩ	1		BTA-82K	
R16	10KΩ	1		BTA-10K	
R17	3. 3 Meg	½		BTS-3. 3 Meg	
R18	150KΩ	½		BTS-150K	
R19	47KΩ	½		BTS-47K	
R20	68Ω	½		BTS-68	
R21	82KΩ	1		BTA-82K	
R22	10KΩ	1		BTA-10K	
R23	220Ω	½		BTS-220	
R24	27KΩ	½		BTS-27K	
R25	6800Ω	½		BTS-6800	
R26	6800Ω	½		BTS-6800	
R27	1 Meg	½		BTS-1 Meg	
R28	3. 6Ω	½	42X233		
R29	12KΩ	½		BTS-12K	
R30	15KΩ	½		BTS-15K	
R31	10 Meg	½		BTS-10 Meg	
R32	270KΩ	½		BTS-270K	
R33	7500Ω	½		BTS-7500	
R34	470Ω	½		BTS-470	
R35	120KΩ	½		BTS-120K	
R36	100KΩ	½		BTS-100K	
R37	2200Ω	½		BTS-2200	
R38	470Ω	½		BTS-470	
R39	220KΩ	½		BTS-220K	
R40	100KΩ	½		BTS-100K	
R41	120KΩ	½		BTS-120K	
R42	68KΩ	½		BTS-68K	
R43	220KΩ	½		BTS-220K	
R44	200Ω	4	43X283	1 3/4-200	
R45	220KΩ	½		BTS-220K	
R46	47KΩ	½		BTS-47K	
R47	680Ω	1		BTA-680	
R48	470KΩ	½		BTS-470K	
R49	1 Meg	½		BTS-1 Meg	
R50	220KΩ	½		BTS-220K	
R51	68KΩ	½		BTS-68K	
R52	10KΩ	½		BTS-10K	
R53	100KΩ	½		BTS-100K	
R54	68KΩ	½		BTS-68K	
R55	15KΩ	½		BTS-15K	
R56	82Ω	1			
R57	82Ω	1			
R58	33KΩ	1		BTA-33K	

TRANSFORMER (POWER)

ITEM No.	RATING PRI.	RATING SEC. 1	RATING SEC. 2	RATING SEC. 3	REPLACEMENT DATA AIRLINE PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.
T1	117VAC	526VCT	12. 6VCT		53X335-A					
	② . 21A	. 118ADC	② 2. 5A							

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE PRI.	IMPEDANCE SEC.	REPLACEMENT DATA AIRLINE PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.	NOTES
T2	8KΩCT	15Ω tap ② 8Ω	51X163	A-3880			Z1404① ②		① Drill one new mounting hole. ② Tape 4Ω secondary tap.

SPEAKER

ITEM No.	RATINGS SIZE	RATINGS FIELD	RATINGS V. C. IMP.	REPLACEMENT DATA AIRLINE PART No.	JENSEN PART No.	QUAM PART No.	NOTES
SP1	12"	PM	8Ω	12A514	ST-885 Mod P12-RX	12A6C0	

COILS (RF-IF)

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA AIRLINE PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	NOTES
L1	FM Ant. Coil	0Ω	0Ω	9A2027				
L2	FM RF Coil	0Ω		9A2024				
L3	Fil. Choke	. 5Ω		9A1881	19-1005		4612	9 Microhenries
L4	FM Osc. Coil	0Ω		9A2023				
L5	AM Loop Ant.	. 1Ω	1. 2Ω	9A2312				
L6	AM RF Coil	30Ω	4. 6Ω	9A2025	14-1072	BC-382	70-RF	
L7	AM Osc. Coil	6. 5Ω		9A2022	14-1033 †	BC-400 †	71-Osc. †	Tapped ② 1. 3Ω
L8	RF Choke	1. 8Ω		35A5	19-1002		4606	2. 2 Microhenries; IRC Part # CLA
L9	RF Choke	. 31Ω		35A7				. 56 Microhenry; IRC Part # CLA
L10	1st FM IF	1. 1Ω	. 9Ω	9A2043	16-3487 ▲	FM-254 ▲	1463 ▲	Pri. tapped ② . 6Ω
L11	1st AM IF	19Ω	19Ω	9A2029				Tertiary winding= 8. 5Ω
L12	2nd FM IF	1. 8Ω	. 5Ω	9A2030	16-3487	FM-254	1463	
L13	2nd AM IF	11Ω	11Ω	9A2042	16-6758	BC-353	12-C2	
L14	Ratio Det.	1. 2Ω	. 1ΩCT	9A2064	17-3487	FM-252	1453	Tertiary winding= . 25Ω

† Drill mounting hole.
▲ No tap on primary winding; connect one side of primary winding to switch.

FILTER CHOKE

ITEM No.	RATINGS TOTAL DIRECT CURRENT	RATINGS D. C. RESISTANCE	RATINGS INDUCTANCE (0 CURRENT 1000 ∿)	REPLACEMENT DATA AIRLINE PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.
L15	. 047A	204Ω	4. 1HY	52X93B	C-1325	C-2977		C5006	T-20C59

SELENIUM RECTIFIER

ITEM No.	RATING CURRENT	REPLACEMENT DATA AIRLINE PART No.	SELETRON PART No.	FEDERAL PART No.	MALLORY PART No.	SARKES TARZIAN PART No.	NOTES
M1	. 29A	66X10				2S26-1C1-RV	

PHONO CARTRIDGE

ITEM No.	REPLACEMENT DATA AIRLINE PART No.	ASTATIC PART No. CARTRIDGE	ASTATIC PART No. NEEDLE	SHURE PART No. CARTRIDGE	SHURE PART No. NEEDLE	ELECTRO-VOICE PART No. CARTRIDGE	ELECTRO-VOICE PART No. NEEDLE	REMARKS
M2	60H30							

PHONO NEEDLE

(FOR REPLACEMENT IN ORIGINAL EQUIPMENT CARTRIDGE)

ITEM No.	REPLACEMENT DATA AIRLINE PART No.	WALCO PART No.	JENSEN PART No.	REMARKS
M3	61H28	W-66TPS	GE-11	

MISCELLANEOUS

ITEM No.	PART NAME	AIRLINE PART No.	NOTES
M4	Dial light	7A244	110-120V 10 watt (phono compartment)
M5	Dial light	7A103	# 47 (upper right and left dial glass)
M6	Dial light	7A32	# 51 (radio-phono-and jewel light)
M7	Tuning cap	14A207	(31-512MMF) (18-502MMF) (15-185MMF)
M8	Switch	2A433	Function selector
	Knob	10A825-1	Volume
	Knob	10A825-2	Tuning
	Knob	10A825-3	Selector
	Knob	10A823-2	Treble
	Knob	10A824	Bass
	Glass	58X775	Dial
	Glass	58X776	Control panel

AIRLINE
MODEL 61-12601

PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST
DENVER, COLORADO

AIRLINE
MODEL 61-12601

TRADE NAME	Airline Model 61-12601
SUPPLIER	Montgomery Ward & Co., 619 Chicago Ave., Chicago, Ill.
TYPE SET	Battery Operated AM Superheterodyne Automobile Receiver
TUBES (Eight)	Types 6BA6 RF Amp., 6BE6 Conv., 6BA6 IF Amp., 6AV6 Det.-AVC-AF Amp., 6AV6 Phase Inv., (2) 6AQ5 Audio Output, 6X4 Rectifier
POWER SUPPLY	6 Volt Storage Battery — RATING 6.5 Amp. @ 6.3 Volts DC
TUNING RANGE—BROADCAST	538-1620KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.
To set pointer, turn tuning capacitor fully closed and set pointer to last reference mark at low frequency end of dial.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.1MFD	High side to pin 7 (grid) of 6BE6 (V2). Low side to chassis.	455KC (400~Mod)	Tuning gang fully open	Across voice coil	A1, A2 A3, A4	Adjust for maximum deflection.
2.	"	"	1620KC	"	"	A5	"
3.	100MMF	High side to antenna lead. Low side to chassis.	1400KC	Tune to 1400KC signal	"	A6, A7	"
4.	"	"	600KC	Tune to 600KC signal	"	A8	"
5.	"	"	600KC	"	"	A9	"
6.	Repeat steps 2 thru 5.						

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PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA: AIR LINE PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RETMA BASE TYPE	NOTES
V1	RF Amplifier	6BA6	6BA6	7BK	
V2	Convertor	6BE6	6BE6	7CH	
V3	Sound IF Amp.	6BA6	6BA6	7BK	
V4	Det.-AVC-AF-Amp.	6AV6	6AV6	7BT	
V5	Phase Inverter	6AV6	6AV6	7BT	
V6	Audio Output	6AQ5	6AQ5	7BZ	
V7	Audio Output	6AQ5	6AQ5	7BZ	
V8	Rectifier	6X4	6X4	5BS	

CAPACITORS

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: AIR LINE PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C1A	■20	350	CE-86	AFH3-107		CO80		FP345.8	TVL-3632	
B	▲20	350								
C	20	25								
C2	.05	200	C503-2	P288-05	DF-503	PJ2S5		PT415	2TM-S5	
C3	.05	200	C503-2	P288-05	DF-503	PJ2S5		PT415	2TM-S5	
C4	.05	200	C503-2	P288-05	DF-503	PJ2S5		PT415	2TM-S5	
C5	100		CC101	SI100	D6-101	TM5T1	GP2K-101	UC-531	5GA-Q1	
C6	200		CC221	SI200	D6-201	TM5T2	GP2K-201	UC-532	5GA-T2	
C7	.01	600	C103-6	P688-01	D6-103	PTE6S1	GP2-333-103	PT611	6TM-S1	
C8	200		CC221	SI200	D6-201	TM5T2	GP2K-201	UC-532	5GA-T2	
C9	200		CC221	SI200	D6-201	TM5T2	GP2K-201	UC-532	5GA-T2	
C10	.005	400	C502-6	P488-005	D6-502	PTE4D5	GP2-333-502	PT425	4TM-D5	
C11	.02	400	C203-4	P488-02	DD-203	PTE4S2		PT412	4TM-S2	
C12	.02	400	C203-4	P488-02	DD-203	PTE4S2		PT412	4TM-S2	
C13	.005	600	C502-6	P688-05	DF-503	PTE6D5	GP2-333-502	PT625	6TM-D5	
C14	.5	100	C504-1	VHC-36		MP2P5		RF-480	HC-3	
C15	.5	100	C504-1	VHC-36		MP2P5		RF-480	HC-3	
C16	.008	1600	C802-16	P1688-008		PTE16D8		PT1628	MB-D8	

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: AIR LINE PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	750KΩ	½	RVTR12	Q13-137	AG-79-Z	B-70-S	U-51	Volume
B	Shaft		Not Req.	Not Req.	FS-3	Not Req.	Not Req.	Attach to R1A
C	Switch		Not Req.	76-1	SWB	Not Req.	US-26	Attach to R1A

RESISTORS

ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: AIR LINE PART No.	IRC PART No.	NOTES
R2	1.2Meg	½	R125	BTS-1.2Meg	
R3	330Ω	½	R331	BTS-330	
R4	22KΩ	½	R223	BTS-22K	
R5	3000Ω	2		BTS-3000	Note 1
R6	22KΩ	2	R223-2	BTB-22K	
R7	2.2Meg	½		BTS-2.2Meg	Note 2
R8	4.7Meg	½	R475	BTS-4.7Meg	
R9	270KΩ	½		BTS-270K	Note 3

ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: AIR LINE PART No.	IRC PART No.	NOTES
R10	47KΩ	½	R473-S	BTS-47K	
R11	4700Ω	½	R472-S	BTS-4700	
R12	82KΩ	½	R823-S	BTS-82K	
R13	470KΩ	½	R474-S	BTS-470K	
R14	330Ω	1	R331-1	BTA-330	
R15	470KΩ	½		BTS-470K	Note 4
R16	1000Ω	1	R102-1	BTA-1000	
R17	100Ω	½	R101	BTS-100	
R18	100Ω	½	R101	BTS-100	

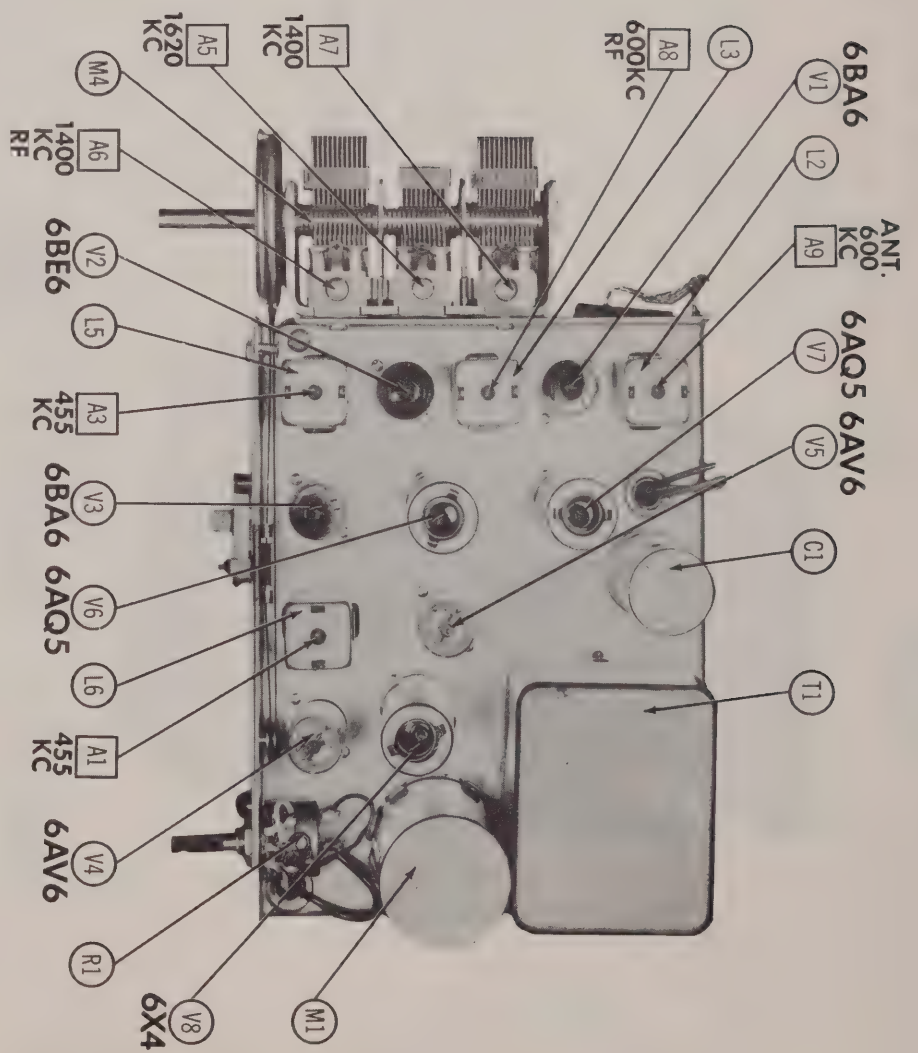
Note 1. Some models may use a 1800Ω resistor in this application.
Note 2. Some models may use a 2 Meg resistor in this application.
Note 3. Some models may use a 240KΩ resistor in this application.
Note 4. Some models may use a 500KΩ resistor in this application.

TRANSFORMER (VIBRATOR)

ITEM No.	RATING: PRI.	RATING: SEC. 1	RATING: SEC. 2	RATING: SEC. 3	REPLACEMENT DATA: AIR LINE PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.
T1	6.3VCT ② 3.4A	430VCT .053A			TV-100EW ①					

① Special shielding used on this transformer.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE PRI.	IMPEDANCE SEC.	REPLACEMENT DATA: AIR LINE PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.	NOTES
T2	6.2KΩ CT	3.6Ω	Part of Spkr.	A-3823	A-3020	S-53X	Z1404	T22S56①	① Drill new mounting hole.

SPEAKER

ITEM No.	RATINGS SIZE	FIELD	V. C. IMP.	REPLACEMENT DATA: AIR LINE PART No.	JENSEN PART No.	QUAM PART No.	NOTES
SP1	6 x 9"	PM	3.6Ω	PM-TR12	ST-810 Mod. P69-V	69A3	

COILS (RF-IF)

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA: AIR LINE PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	NOTES
L1	Ant. Coupling	1.1Ω		L200			4624 *	Wound on 10MMF capacitor in series; part # includes capacitor.
L2	Ant. Coil	20Ω	5.5Ω	57FB-3				
L3	RF Coil	95Ω	6Ω	57FB-4				
L4	Osc. Coil	8.5Ω		L201			71-Osc †	Tapped @ .8Ω
L5	Input IF	18Ω	18Ω	1655-16	16-6758	BC-352	12-C1	
L6	Output IF	18Ω	18Ω	1655-16	16-6758	BC-353	12-C2	
L7	Fil. Choke	0Ω		L-202			5221	1.5Microhenries
L8	Vibrator Hash Choke	0Ω		L203			5221	21Microhenries

* Connect 10MMF capacitor in series.
† Drill mounting hole.

VIBRATOR

ITEM No.	TYPE	INPUT VOLTS	FREQUENCY	REPLACEMENT DATA: AIR LINE PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	RADIART PART No.	NOTES
M1	Interrupter	6.3V	115∿	V-83	5301	859	5301	

FUSES

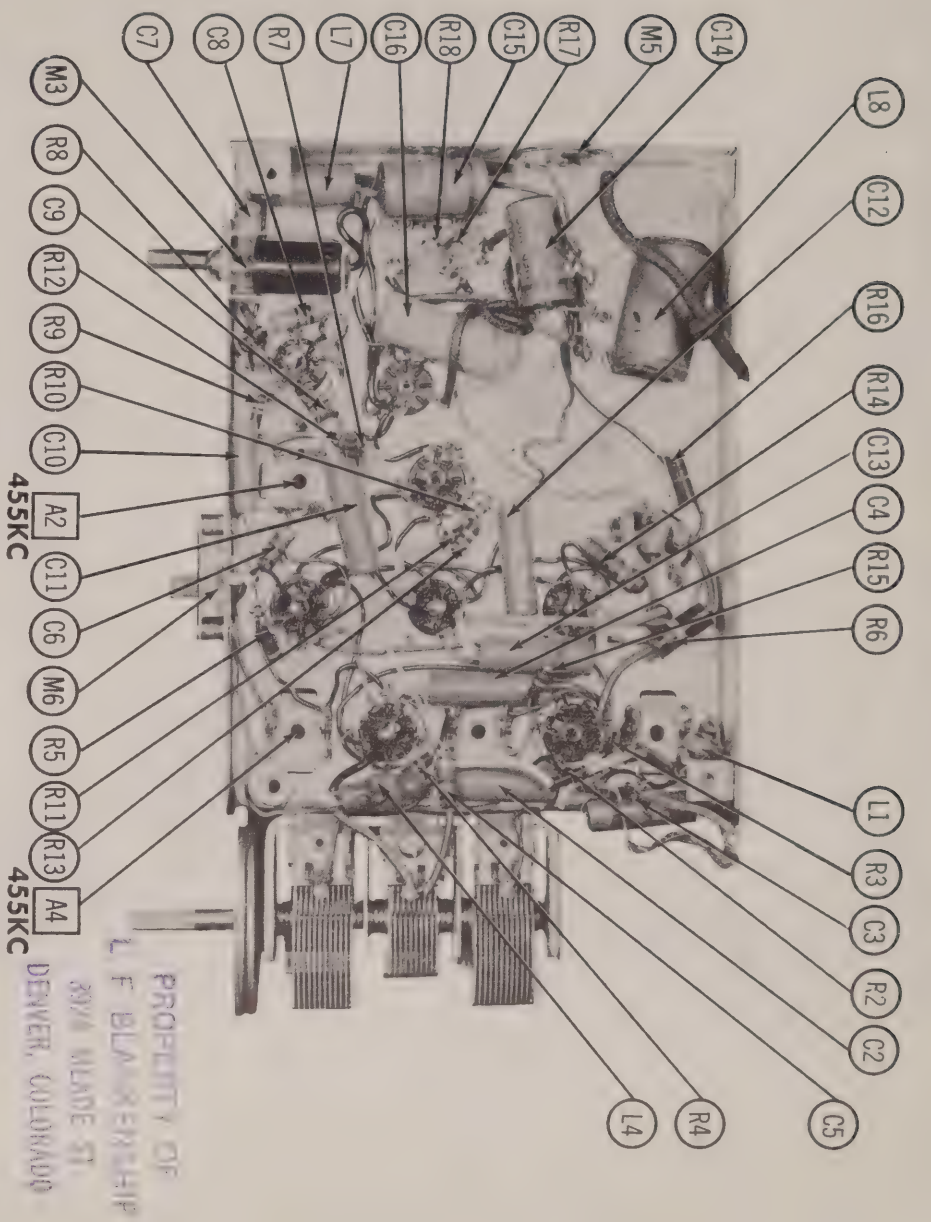
ITEM No.	TYPE	RATING	REPLACEMENT DATA: AIR LINE PART No. FUSE	AIR LINE PART No. HOLDER	LITTELFUSE PART No. FUSE	LITTELFUSE PART No. HOLDER	BUSS PART No. FUSE	BUSS PART No. HOLDER
M2	3AG	15A	A201	A-TR12	311015. (3AG-15A)	155020	AGC15	HDJ

MISCELLANEOUS

ITEM No.	PART NAME	AIR LINE PART No.	NOTES
M3	Dial light	T47	# 47 bayonet
M4	Tuning cap	CV-100A	3 gang (23-391MMF, 24-387MMF, 35-198MMF)
M5	Spark plate		
M6	Switch	SS-1	Tone (DPST slide)
	Knob	H310E	(2) used
	Dial scale	D-TR12	
	Antenna	WA-TR12	Telescopic
	Case	H1202	Less covers
	Back cover	H1203	
	Front cover	H1204	
	Shock Mount	H1207	Rubber
	Thumb catch	H1208L	Left
	Thumb catch	H1208R	Right

SET 241 FOLDER 3

CHASSIS—BOTTOM VIEW



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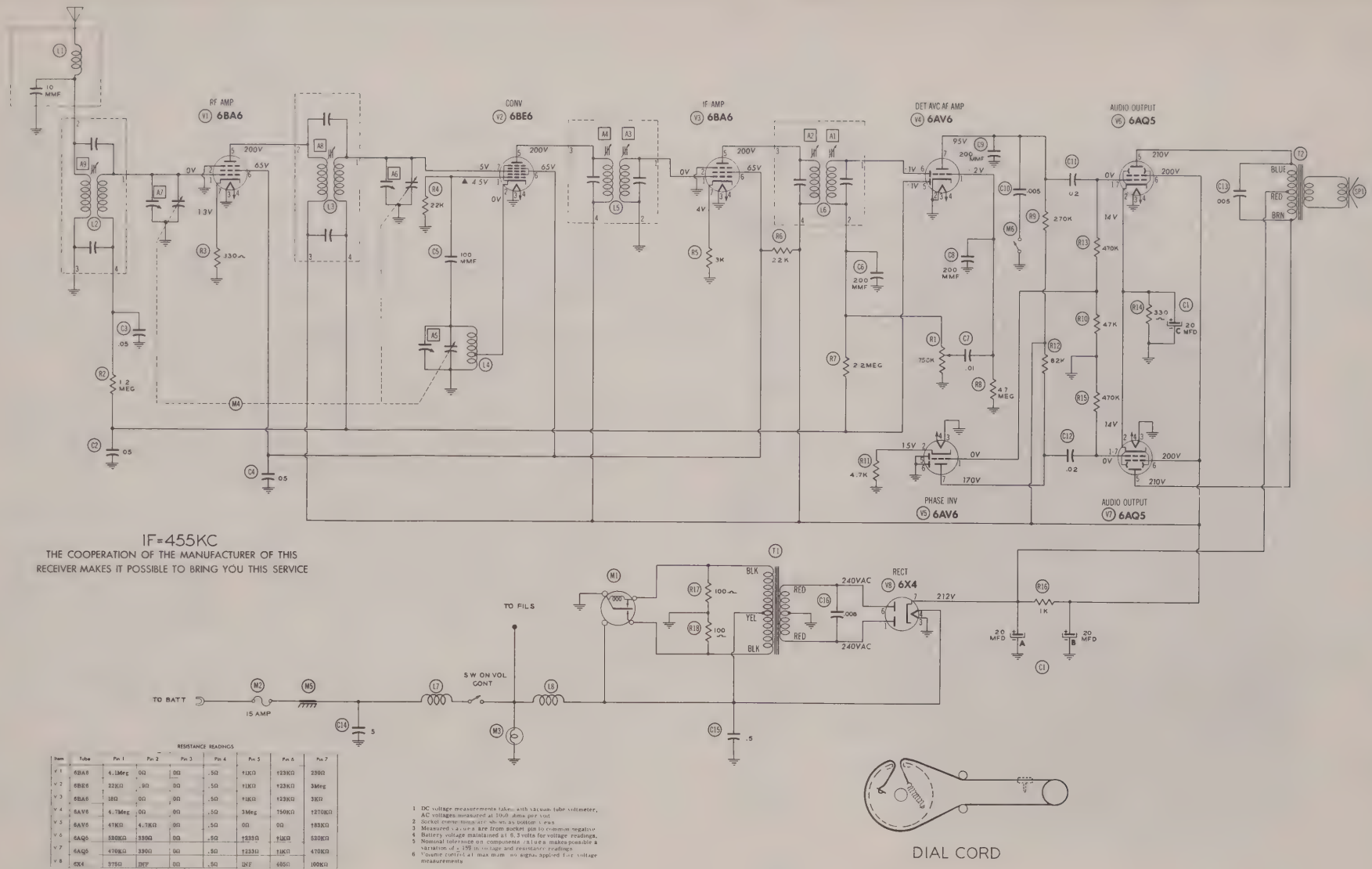

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V 1	6BA6	4.1Meg	0Ω	0Ω	.5Ω	†1KΩ	†23KΩ	230Ω
V 2	6BE6	22KΩ	.9Ω	0Ω	.5Ω	†1KΩ	†23KΩ	3Meg
V 3	6BA6	18Ω	0Ω	0Ω	.5Ω	†1KΩ	†23KΩ	3KΩ
V 4	6AV6	4.7Meg	0Ω	0Ω	.5Ω	3Meg	750KΩ	†270KΩ
V 5	6AV6	47KΩ	4.7KΩ	0Ω	.5Ω	0Ω	0Ω	†85KΩ
V 6	6AQ6	530KΩ	330Ω	0Ω	.5Ω	†235Ω	†1KΩ	530KΩ
V 7	6AQ6	470KΩ	330Ω	0Ω	.5Ω	†235Ω	†1KΩ	470KΩ
V 8	6X4	375Ω	INF	0Ω	.5Ω	INF	605Ω	100KΩ

* TAKEN WITH VACUUM TUBE VOLTMETER
† MEASURED FROM PIN 7 OF V8

1 DC voltage measurements taken with vacuum tube voltmeter, AC voltages measured at 10,0 ohms per volt
2 Socket connections are shown as bottom views
3 Measured voltages are from socket pin to common negative
4 Battery voltage maintained at 6.3 volts for voltage readings.
5 Nominal tolerance on components values makes possible a variation of ± 15% in voltage and resistance readings
6 Signal supplied at max. gain, 400 signals applied for voltage measurements

DIAL CORD

A PHOTOFACT STANDARD NOTATION SCHEMATIC
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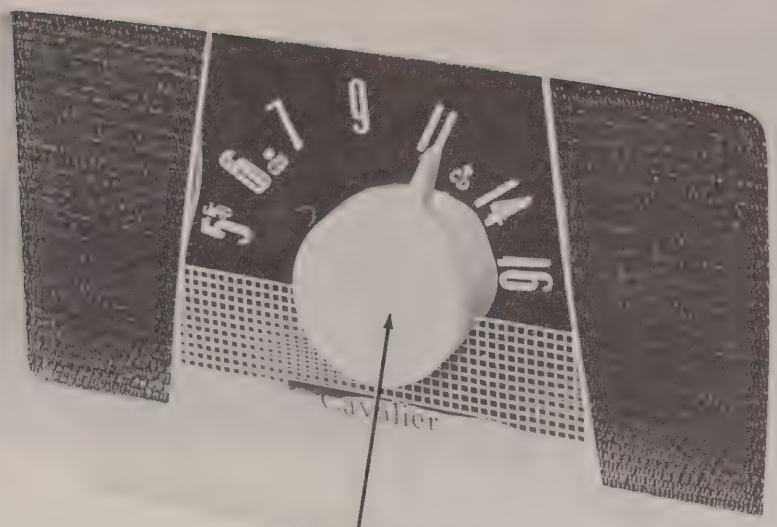
CAVALIER
MODEL 5AT1



PROPERTY OF
L. F. BLANKENSHIP
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DENVER, COLORADO

TUNING CONTROL

VOLUME CONTROL ON-OFF SWITCH

CAVALIER
MODEL 5AT1

TRADE NAME	Cavalier Model 5AT1
MANUFACTURER	Hinners-Galanek Radio Corp., 2514 Broadway, Long Island City 6, N.Y.
TYPE SET	AC-DC Operated AM Superheterodyne Receiver
TUBES (Five)	Types 12BE6 Conv., 12BA6 IF Amp., 12AT6 Det.-AVC-AF Amp., 50C5 Audio Output, 35W4 Rectifier
POWER SUPPLY	110-120 Volts AC-DC RATING .26 Amp. @ 117 Volts AC
TUNING RANGE—BROADCAST	535-1620KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Use isolation transformer, if available. If not, connect a .1MFD capacitor in series with low side of signal generator and B-. Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.1MFD	High side to pin 7 (grid) of 12BE6 (V1). Low side to B-.	455KC (400~Mod)	Tuning gang fully open	Across voice coil	A1, A2, A3, A4	Adjust for maximum output. If isolation transformer is not used, reduce dummy antenna to .001MFD to reduce hum modulation.
2.		Loop	1620KC	"	"	A5	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
3.		"	1400KC	Tune for max. signal	"	A6	"

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PARTS LIST AND DESCRIPTIONS

CAVALIER MODEL 5AT1

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA: CAVALIER PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RETMA BASE TYPE	NOTES
V1	Converter	12BE6	12BE6	7CH	
V2	IF Amplifier	12BA6	12BA6	7BK	
V3	Det-AVC-AF Amp.	12AT6	12AT6	7BT	
V4	Audio Output	50C5	50C5	7CV	
V5	Rectifier	35W4	35W4	5BQ	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: CAVALIER PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C1A	70	150		PRS150/50-30-20		BBRD8415		3N536	TVA-2460	Red Blue
B	30	150								
C2	.047	200		P288-047	DF-503	PJ2S47		PT415	2TM-S47	
C3	100			SI100	D6-101	TP34	GP1K-101	UC-531	5GA-T1	
C4	.002	600		P688-002	D6-202	CUB6D2	GP2L-202	PT622	6TM-D2	
C5	.01	400		P488-01	D6-103	CUB4S1	GP2-333-103	PT411	4TM-S1	
C6	20000			BPD-02		K085		PT412	5HK-S2	
C7	.047	600		489ZX-047		PJ6S47		PT6147	6TM-S47	
C8	300			SI300	D6-301	TP42	GP2K-301	UC-533	5GA-T3	

CONTROLS

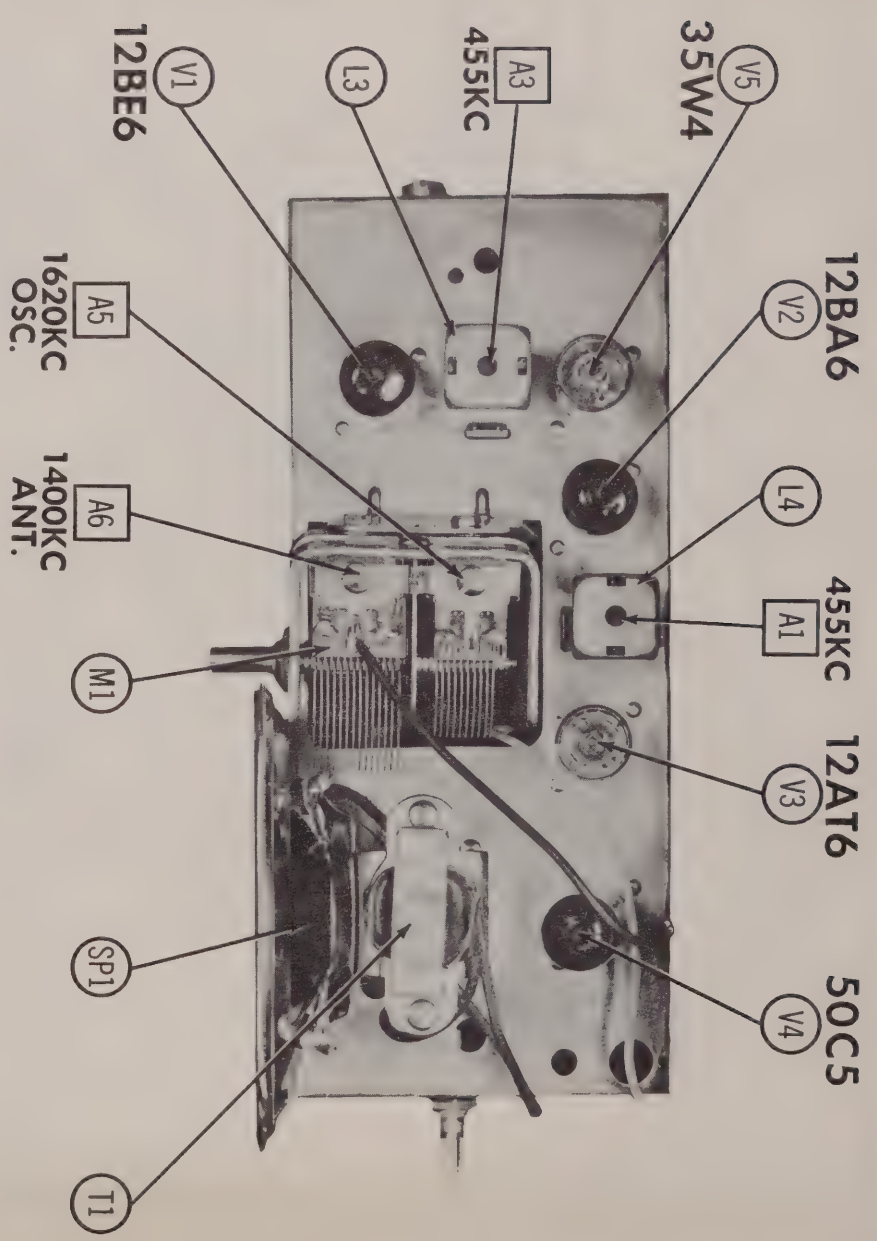
ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: CAVALIER PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	500KΩ	½	120-106	Q13-133	AG-60-S	BSK-60-S	U-48	Volume
B	Shaft		Not Req.	Not Req.	KSS-3	Not Req.	Not Req.	Attach to R1A
C	Switch		Not Req.	76-1	SWB	Not Req.	US-26	Attach to R1A

RESISTORS

ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: CAVALIER PART No.	IRC PART No.	NOTES
R2	22KΩ	½		BTS-22K	
R3	100KΩ	½		BTS-100K	
R4	330Ω	½		BTS-330	
R5	2.2 Meg	½		BTS-2.2Meg	
R6	8.2 Meg	½		BTS-8.2Meg	

ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: CAVALIER PART No.	IRC PART No.	NOTES
R7	240KΩ	½		BTS-240K	
R8	330KΩ	½		BTS-330K	
R9	2200Ω	2		BTB-2200	
R10	22Ω	½		BTS-22	

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	CAVALIER PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.	
T1	2.4KΩ	3.3Ω		A-3332	A-3025	S-1X ①	Z1101	TS-24S50①	① Drill one new mounting hole.

SPEAKER

ITEM No.	RATINGS			REPLACEMENT DATA			NOTES
	SIZE	FIELD	V. C. IMP.	CAVALIER PART No.	JENSEN PART No.	QUAM PART No.	
SP1	4"	PM	3.3Ω		ST-113 Mod P4-X	4A07	

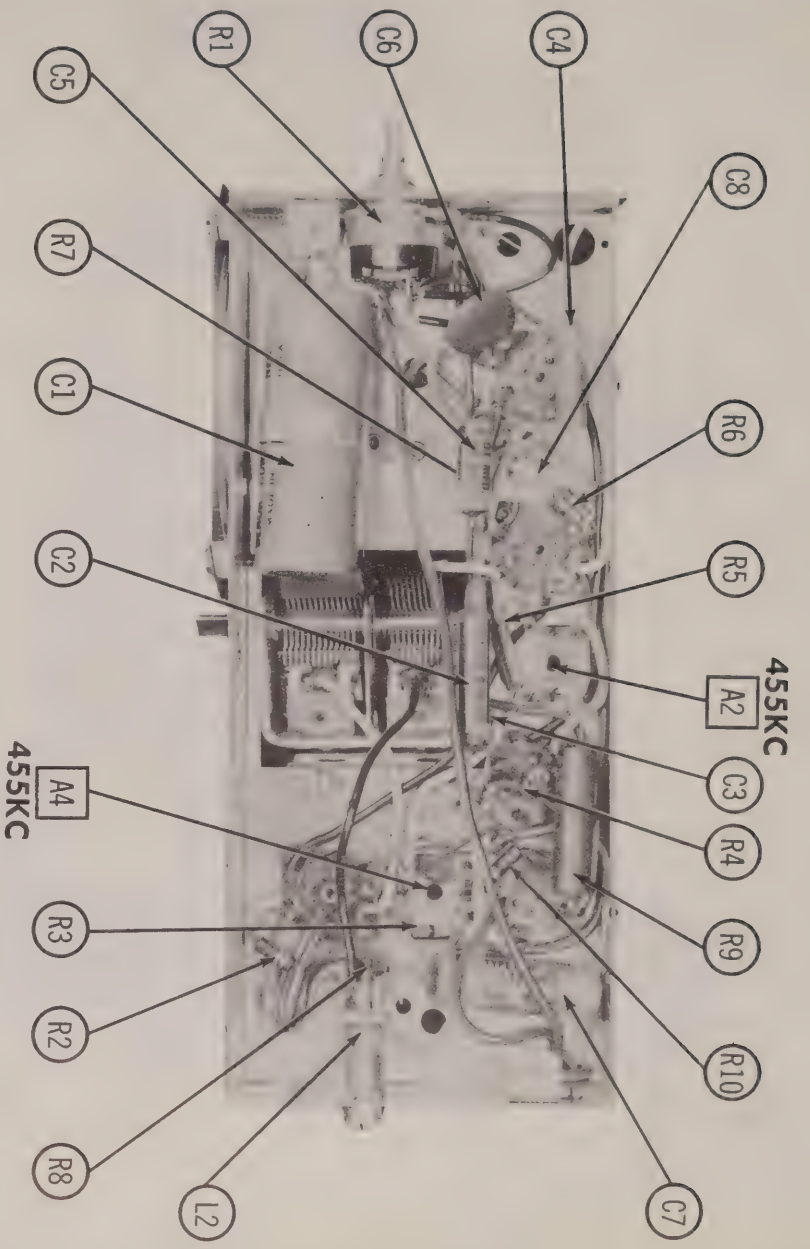
COILS (RF-IF)

ITEM No.	USE	DC RES.		REPLACEMENT DATA				NOTES
		PRI.	SEC.	CAVALIER PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L1	Loop Ant.	3.3Ω						
L2	Osc. Coil	.5Ω	6Ω		14-1073		69-Osc.	
L3	Output IF	18Ω	18Ω	130-102	16-6758	BC-352	12-C1	
L4	Output IF	18Ω	18Ω	130-102	16-6758	BC-353	12-C2	

MISCELLANEOUS

ITEM No.	PART NAME	CAVALIER PART No.	NOTES
M1	Tuning cap	160-104	2 section (34-457MMF) (37-200MMF)

CHASSIS—BOTTOM VIEW



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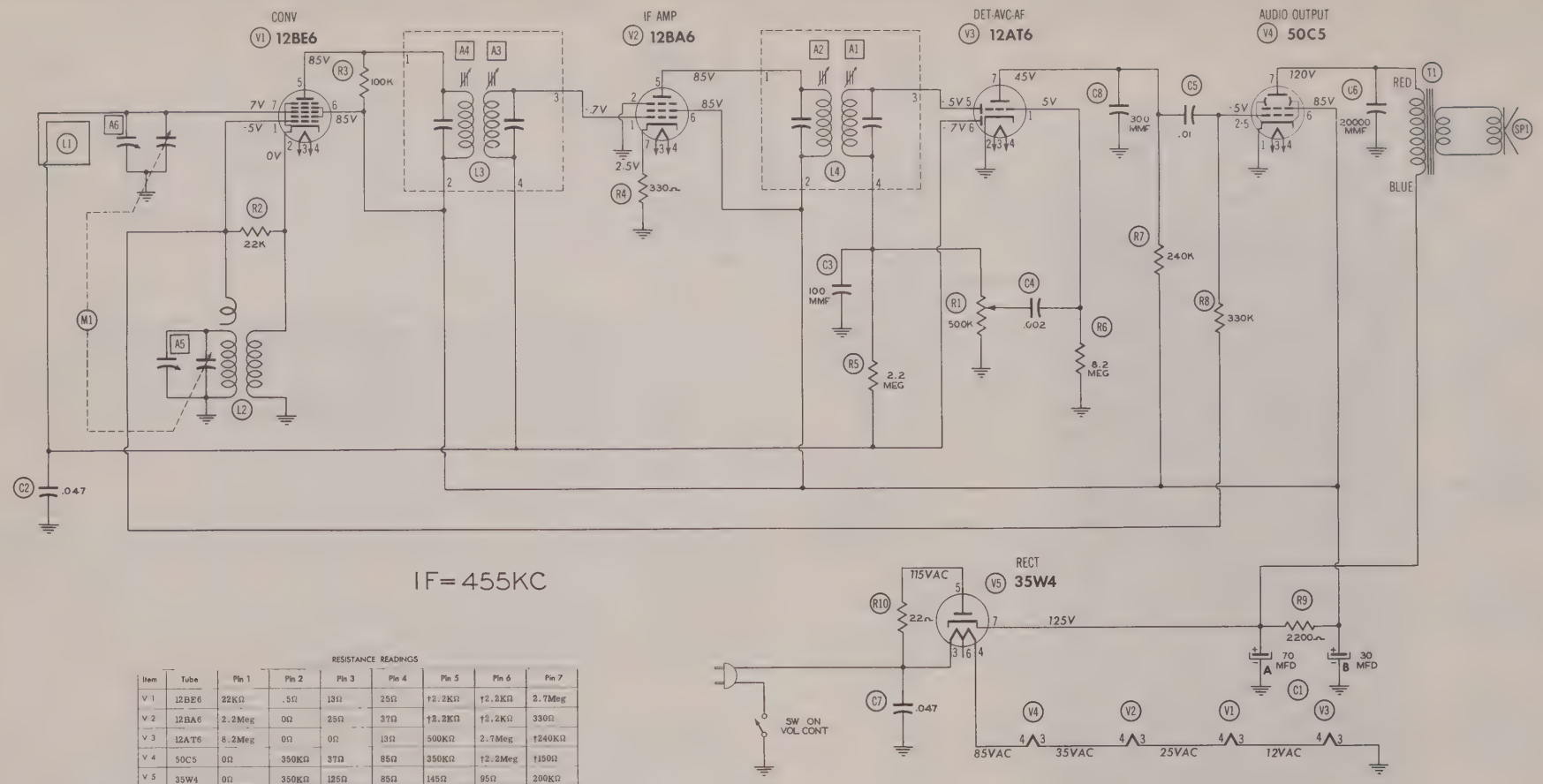
CAVALIER MODEL 5AT1



Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V 1	12BE6	22KΩ	.5Ω	13Ω	25Ω	†2.2KΩ	†2.2KΩ	2.7Meg
V 2	12BA6	2.2Meg	0Ω	25Ω	37Ω	†2.2KΩ	†2.2KΩ	330Ω
V 3	12AT6	8.2Meg	0Ω	0Ω	13Ω	500KΩ	2.7Meg	†240KΩ
V 4	50C5	0Ω	350KΩ	37Ω	85Ω	350KΩ	†2.2Meg	†150Ω
V 5	35W4	0Ω	350KΩ	125Ω	85Ω	145Ω	95Ω	200KΩ

† MEASURED FROM PIN 7 OF V5

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

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DAVID BOGEN
MODELS RP-1, RP-1L

MIKE VOLUME CONTROL

PHONO VOLUME CONTROL

ON-OFF SWITCH

DAVID BOGEN
MODELS RP-1, RP-1L

TRADE NAME	David Bogen Model RP-1, RP-1L
MANUFACTURER	David Bogen Co., Inc., 29 Ninth Ave., New York, 14, N.Y.
TYPE SET	AC Operated 2 Channel Audio Pre-Amplifier
TUBES (Four)	Types (2) 6SF5 AF Amp., 6J5 Cathode Follower, 6X5 Rectifier
POWER SUPPLY	110-120 Volts AC-60 Cycles RATING .16 Amp. @ 117 Volts AC

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PARTS LIST AND DESCRIPTIONS

DAVID BOGEN
MODEL RP-1

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA		RETMA BASE TYPE	NOTES
		David Bogen PART No.	STANDARD REPLACEMENT		
V1	Pre-Amplifier	6SF5	6SF5	6AB	
V2	AF Amplifier	6SF5	6SF5	6AB	
V3	Cathode Follower	6J5	6J5	6Q	
V4	Rectifier	6X5GT	6X5GT	6S	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	David Bogen PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C1A	■40	150		AFH3-09		C008			R1429	
B	▲30	150								
C	10	150								
C2	8	450		PRS450/8		BR845A		TC71	TVA-1704	Note 1
C3	100	25		PRS25/100		BRH251A		TC2501	TVA-1207	
C4	10	25		PRS25/10		BR102A		TC22	TVA-1240	
C5	.05	400		P488-05		PTE4S5		PT415	4TM-S5	
C6	.02	600		P688-02		PTE6S2		PT612	6TM-S2	
C7	.05	400		P488-05		PTE4S5		PT415	4TM-S5	
C8	.5	400		P484-5		MP4P5		PT405	4TM-P5	Note 2
C9	.5	400		P484-5		MP4P5		PT405	4TM-P5	
C10	.1	400		489ZX-1		PTE4P1		PT401	4TM-P1	

Note 1. Some Models use a 16MFD @ 450V in this application.
Note 2. Some Models combine C8 and C9 in one 1.0MFD @ 400V capacitor.

CONTROLS

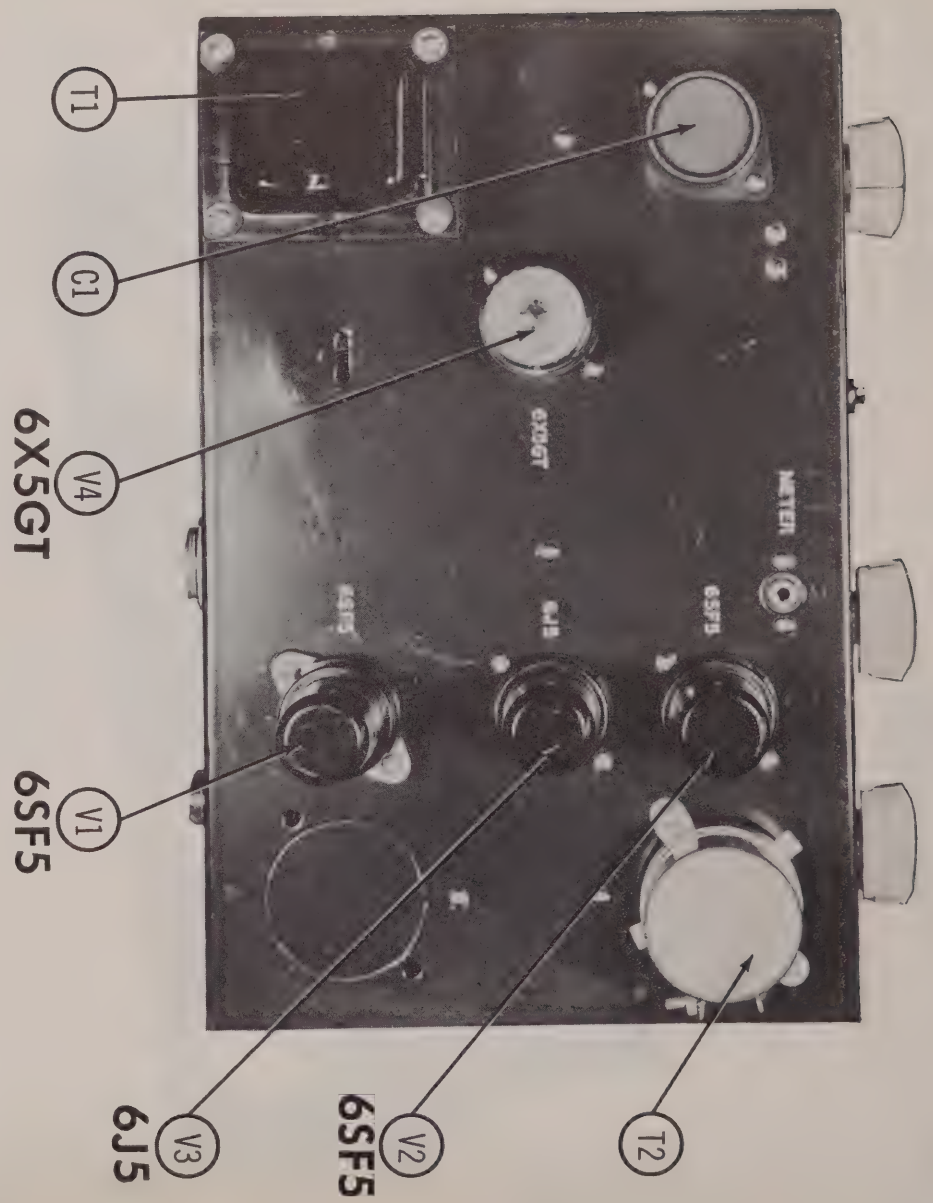
ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	David Bogen PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	
R1A	500K	½	V-202-C	Q13-133	AG-60-Z	B-60	U-48	Mike volume
B	Shaft		Not Req.	Not Req.	FS-3	Not Req.	Not Req.	Attach to R1A
R2A	500K	½	V-202-C	Q13-133	AG-60-Z	B-60	U-48	Phonograph volume
B	Shaft		Not Req.	Not Req.	FS-3	Not Req.	Not Req.	Attach to R2A

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	David Bogen PART No.	IRC PART No.	
R3	470KΩ	½		BTS-470K	
R4	3300Ω	½		BTS-3300	
R5	220KΩ	½		BTS-220K	
R6	220KΩ	½		BTS-220K	
R7	470KΩ	½		BTS-470K	
R8	470KΩ	½		BTS-470K	
R9	330KΩ	½		BTS-330K	
R10	2200Ω	½		BTS-2200	
R11	8200Ω	½		BTS-8200	
R12	220KΩ	½		BTS-220K	
R13	47KΩ	½		BTS-47K	

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	David Bogen PART No.	IRC PART No.	
R14	1000Ω	½		BTS-1000	
R15	15KΩ	½		BTS-15K	
R16	4700Ω	½		BTS-4700	
R17	4700Ω	½		BTS-4700	
R18	3300Ω	½		BTS-3300	
R19	47KΩ	½		BTS-47K	
R20	3300Ω	½		BTS-3300	
R21	100Ω	½		BTS-100	
R22	100Ω	½		BTS-100	
R23	4.7Ω	½			

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (POWER)

ITEM No.	RATING				REPLACEMENT DATA					
	PRI.	SEC. 1	SEC. 2	SEC. 3	David Bogen PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.
T1	117VAC @ .16A	290VCT .008A	6.3VAC @ 1.7A		T-375					

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	David Bogen PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.	
T2	8.9KΩ	500Ω tap @ 200Ω @ 50Ω	T-273						

TRANSFORMER (INPUT)

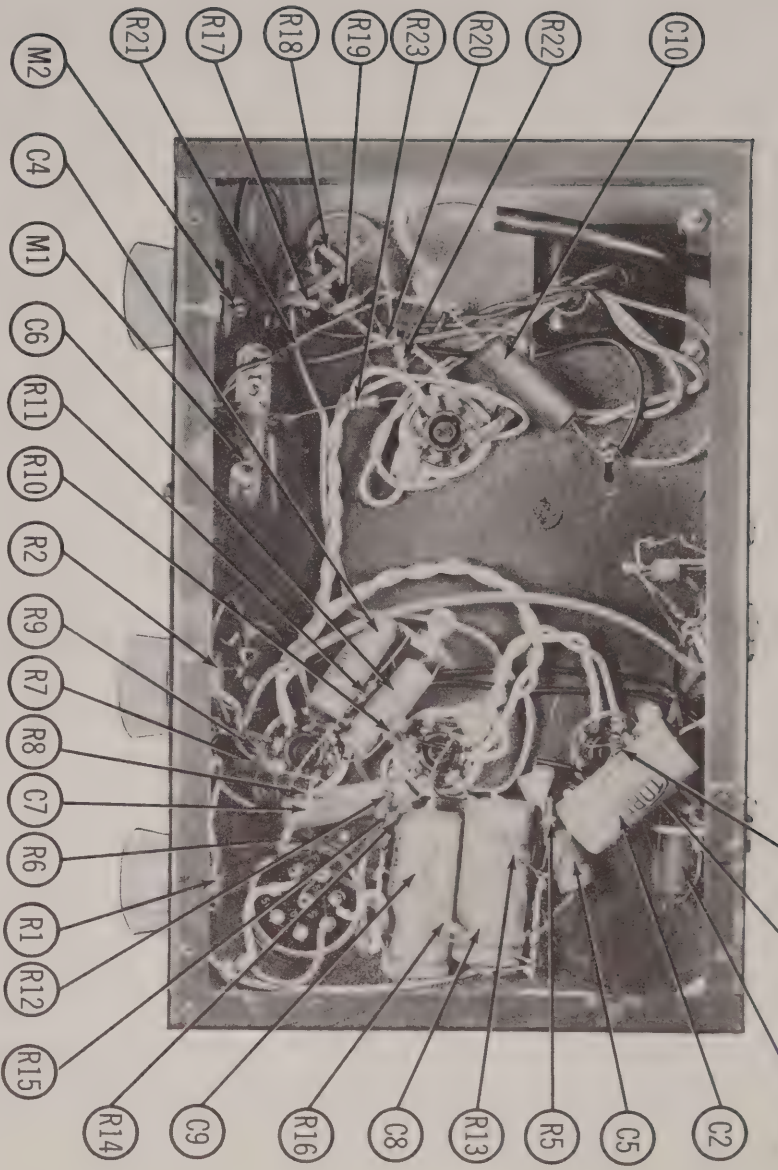
ITEM No.	RATING				REPLACEMENT DATA					
	PRI.	SEC. 1	SEC. 2	SEC. 3	David Bogen PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.
T3	500Ω tap @ 200Ω @ 50Ω				T-118 ①					

① Low imp. input used on model RP-1L.

MISCELLANEOUS

ITEM No.	PART NAME	David Bogen PART No.	NOTES
M1	Pilot light		# 47 power indicator
M2	Switch		Off-on S.P.S.T.

CHASSIS—BOTTOM VIEW



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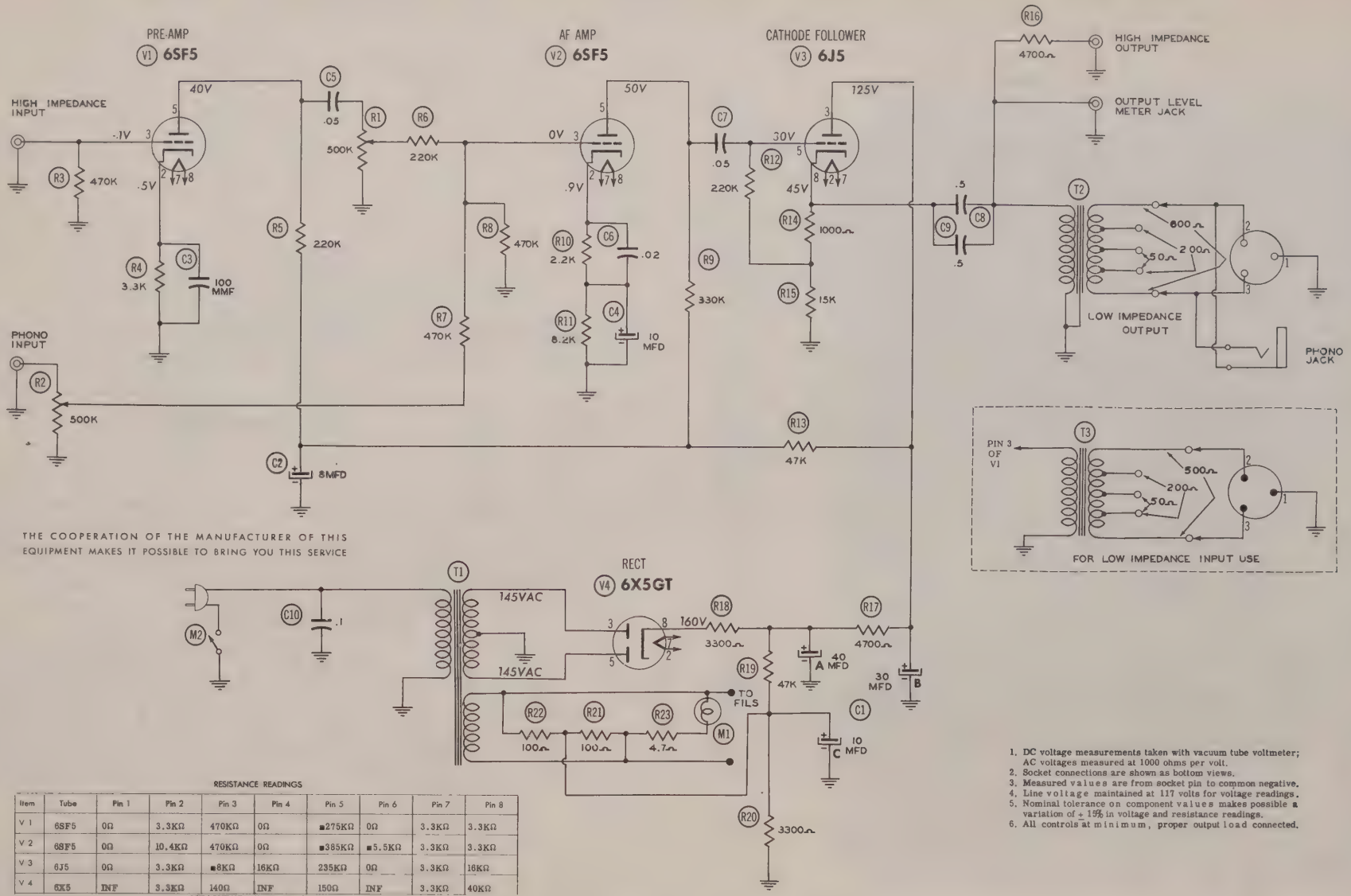
DAVID BOGEN
MODEL RP-1



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RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
V 1	6SF5	0Ω	3.3KΩ	470KΩ	0Ω	■275KΩ	0Ω	3.3KΩ	3.3KΩ
V 2	6SF5	0Ω	10.4KΩ	470KΩ	0Ω	■385KΩ	■5.5KΩ	3.3KΩ	3.3KΩ
V 3	6J5	0Ω	3.3KΩ	■8KΩ	16KΩ	235KΩ	0Ω	3.3KΩ	16KΩ
V 4	6X5	INF	3.3KΩ	140Ω	INF	150Ω	INF	3.3KΩ	40KΩ

■ MEASURED FROM PIN 8 OF V4

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6. All controls at minimum, proper output load connected.

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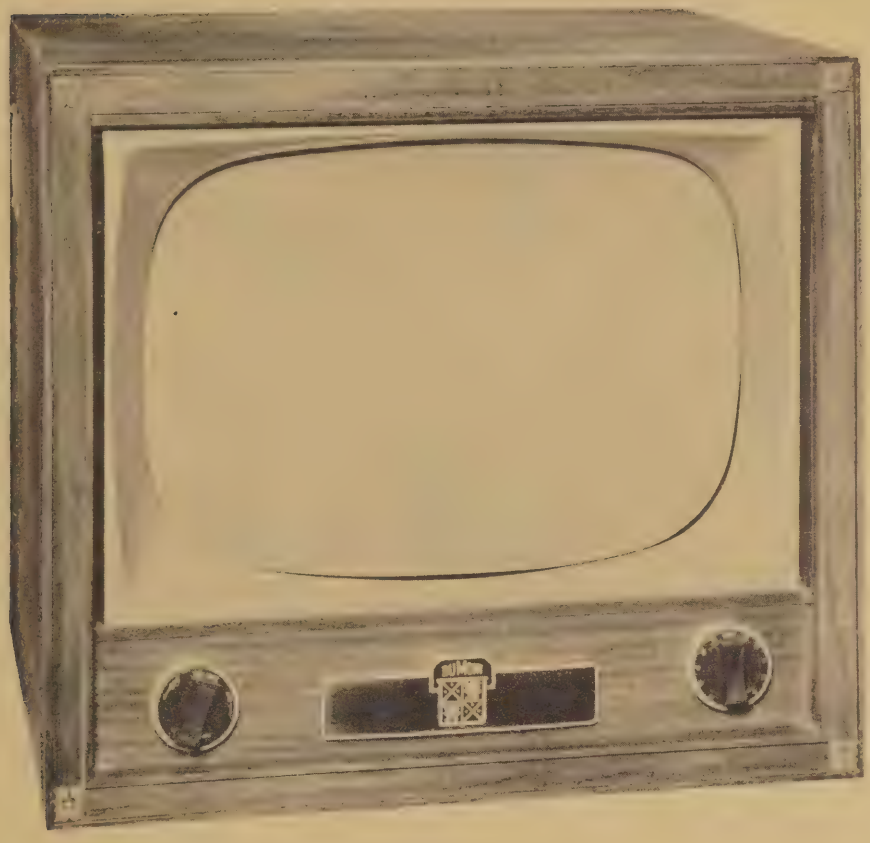

CHASSIS RA-307

DUMONT
MODELS RA-306, RA-307

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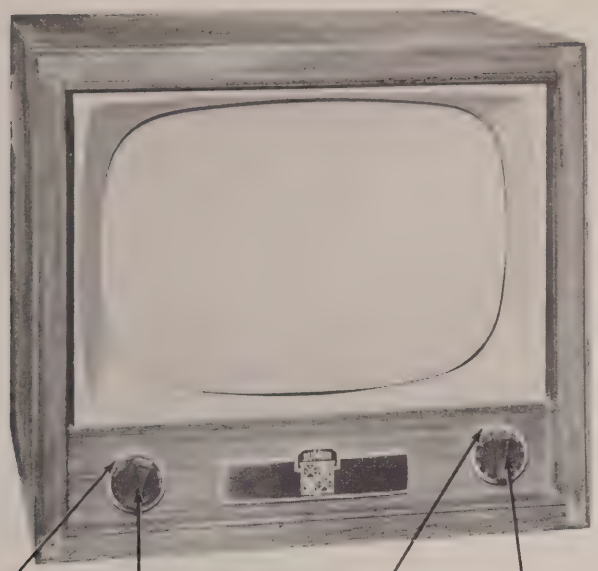
DUMONT
MODELS RA-306, RA-307



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DUMONT
MODELS RA-306, RA-307

DUMONT MODEL WARREN (Ch. RA-307)

TRADE NAME	Dumont	MODELS
		Warren RA-306, RA-307
		Bradford RA-306, RA-307
		Bristol RA-306, RA-307
		Hampton RA-306, RA-307
		Newport RA-306, RA-307
		Rutland RA-306, RA-307
		Windson RA-306, RA-307
		Warwick RA-306, RA-307
MANUFACTURER	Allen B. Dumont Laboratories, Inc., 257 Sixteenth Ave., Patterson, N.J.	
TYPE SET	Television Receiver	
TUBES	Twenty-four	
POWER SUPPLY	110-120 Volts AC-60 Cycles	RATING 1.75 Amp. @ 117 Volts AC
TUNING RANGE	Channels 2 thru 13 VHF, 14 thru 83 UHF, Video IF 45.75MC, Sound IF 41.25MC (Intercarrier)	

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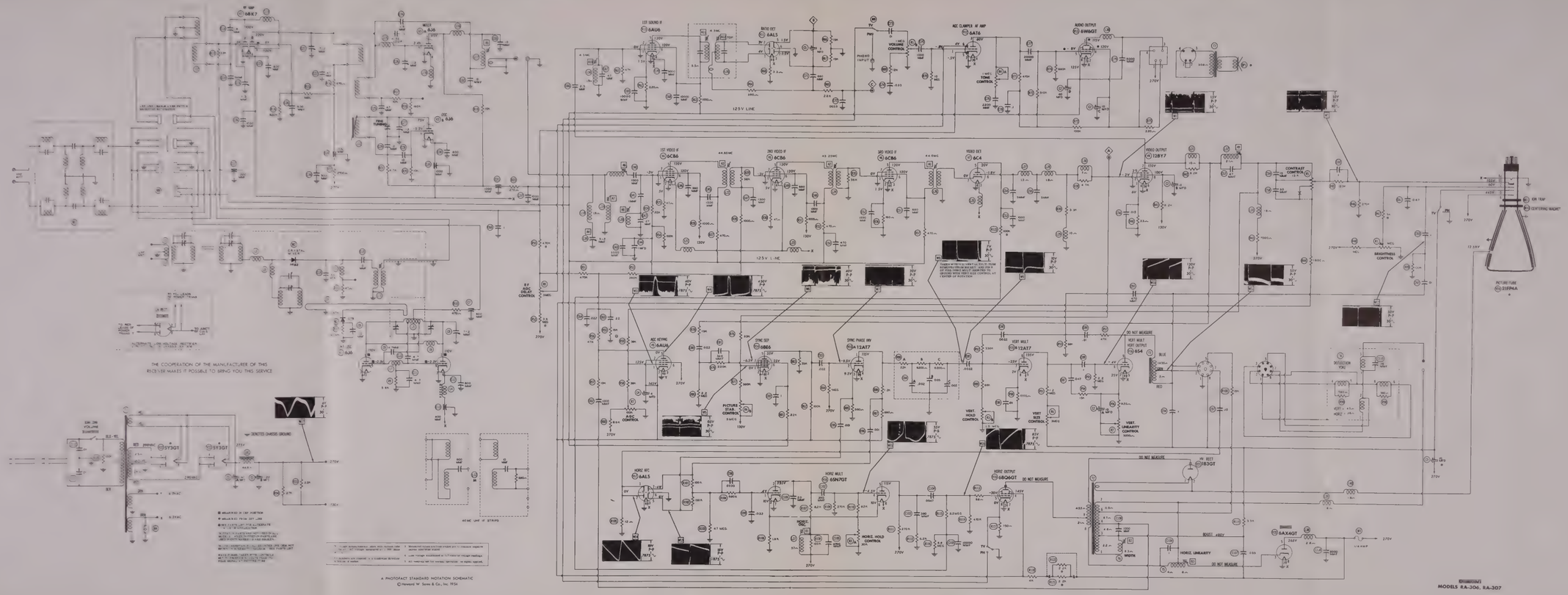
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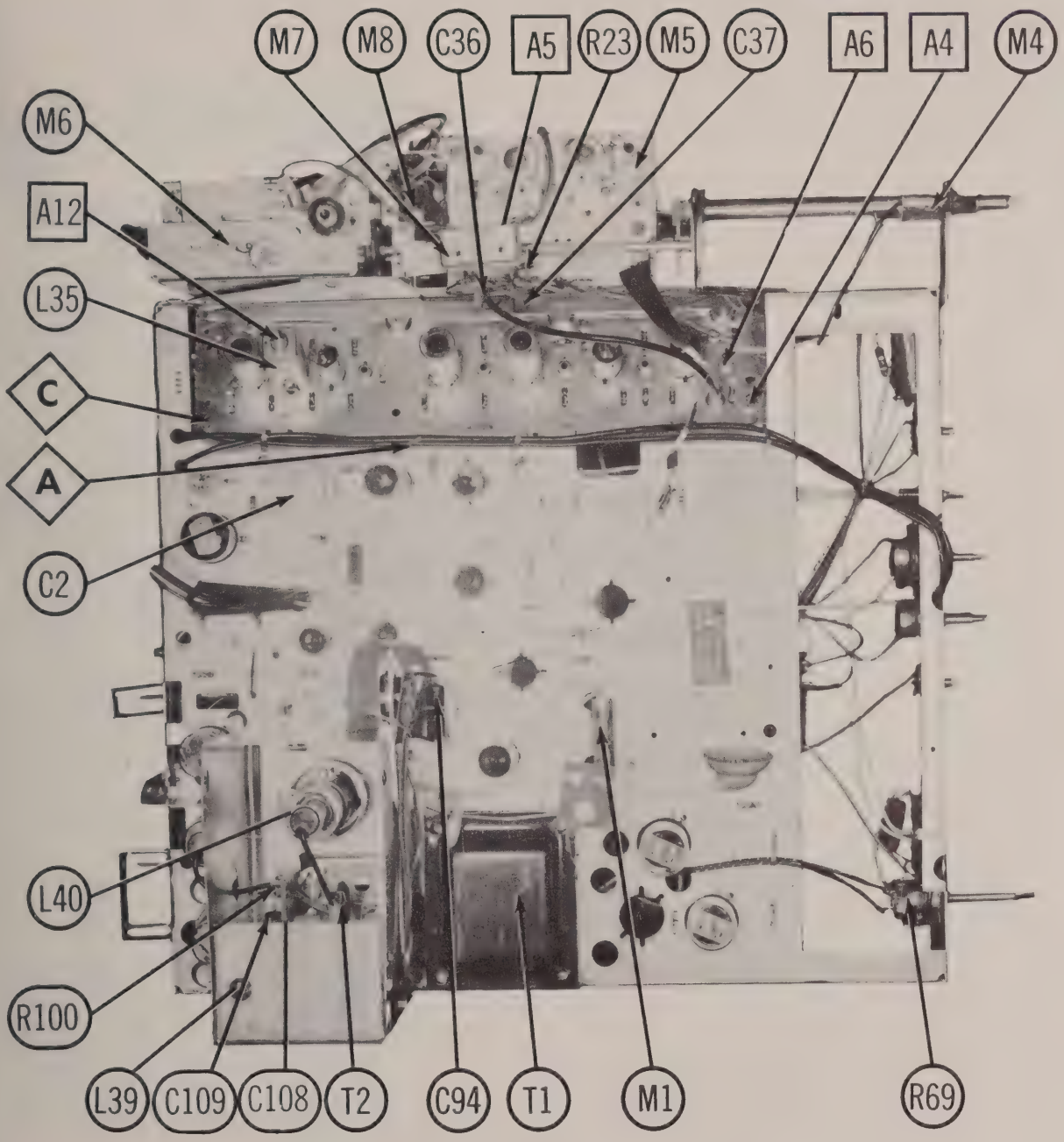
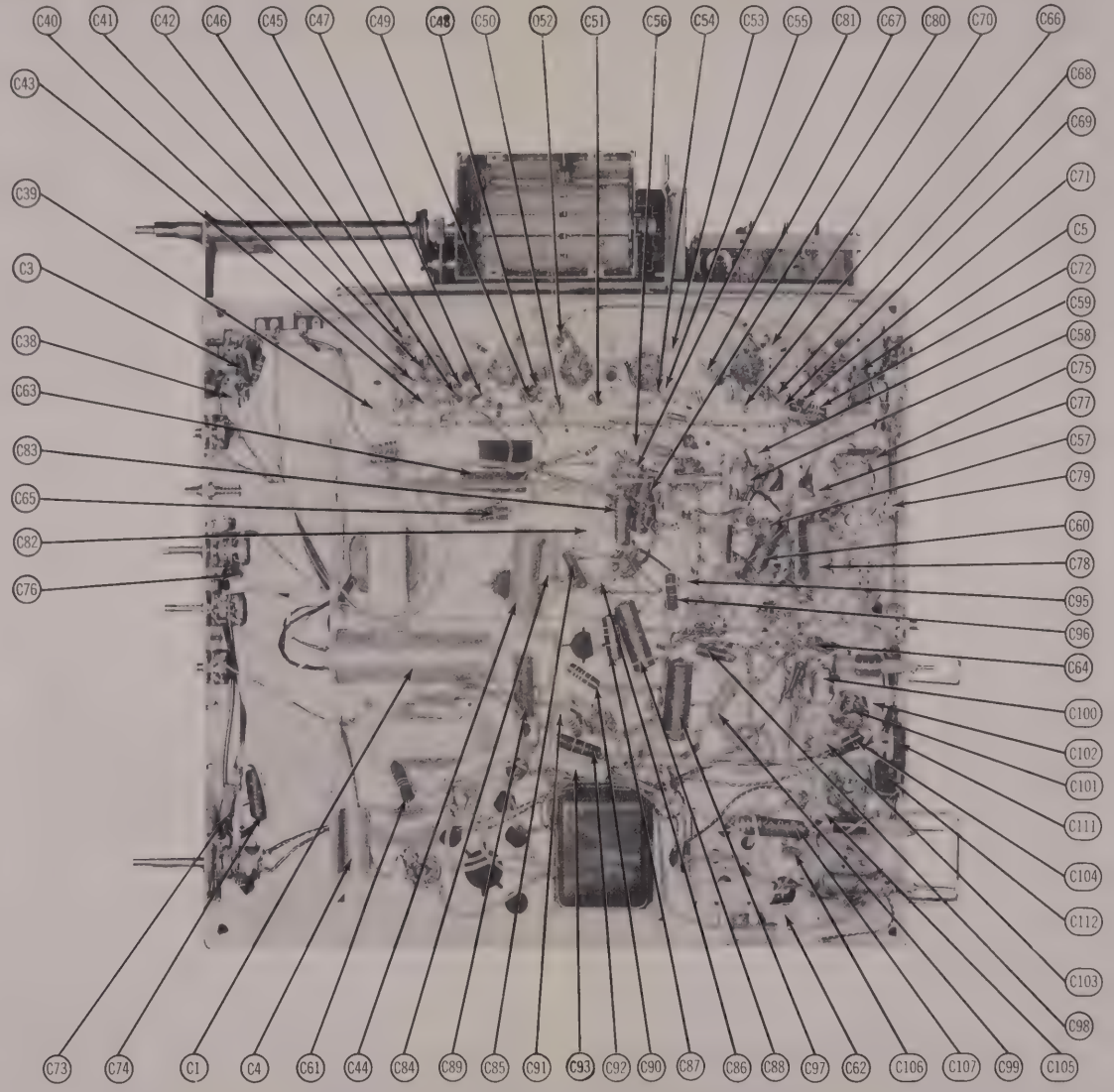


CHASSIS TOP VIEW



CHASSIS BOTTOM VIEW-CAPACITOR IDENTIFICATION

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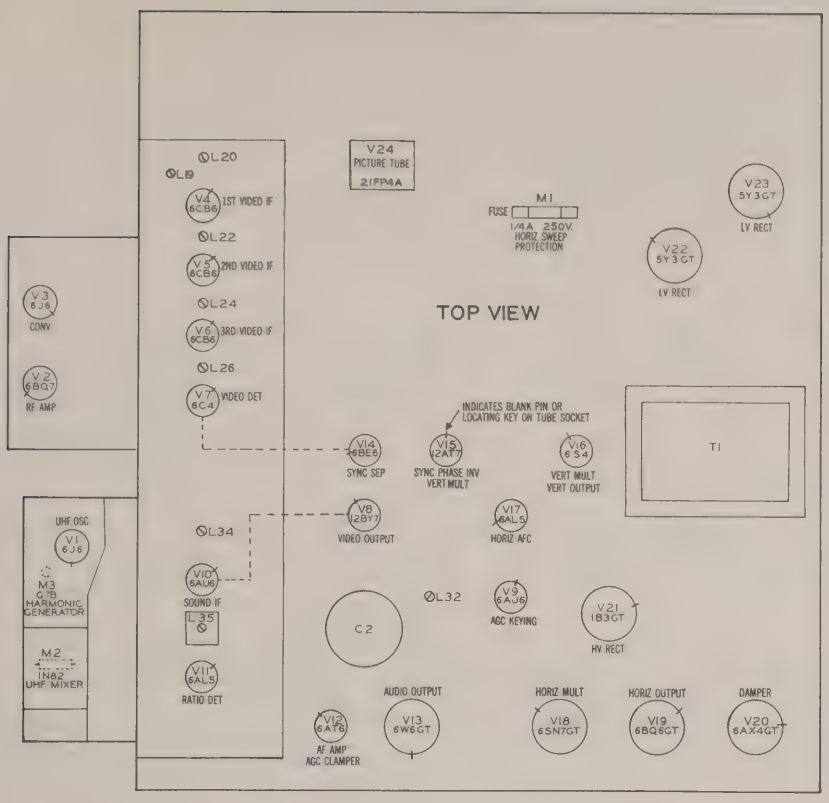
TUBE PLACEMENT CHART



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TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce the indicated symptoms. Refer to tube placement chart for location and type of tube.

POWER SUPPLY FAILURE
No raster, no sound - V22, V23

LOSS OF PICTURE OR SOUND
No pic, no sound, has raster - V3, V4, V5, V6, V7, V8, V13 (V1, UHF" only)
No pic, no sound, has snow - V2, V3, V4
No pic, has sound, has raster - V8, V24
Has pic, no sound - V10, V11, V12, V13
Overloaded picture - V9, V12

SYNC FAILURE
No vert. sync - V15, V16
No horiz. sync - V15, V17, V18
No vert. or horiz. sync - V14, V15

SWEEP FAILURE
No raster, has sound - V18, V19, V20, V21, V24, Fuse (M1)
No vertical deflection - V15, V16
Poor vert. linearity or foldover - V15, V16
Poor horiz. linearity or foldover - V18, V19, V20
Narrow picture - V18, V19, V20, V21, V22, V23
Vert. off freq. - V15, V16
Horiz. off freq. - V15, V17, V18

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

The high voltage shock hazard may be eliminated by removing the 6BQ6 (V19) and the 6AX4 (V20) from their socket.

VIDEO IF ALIGNMENT

Place the channel selector switch between any two channels. This will disable the local oscillator and reduce the possibility of erroneous indications.
Wrap one end of a short length of wire around pin 5 (grid) of the 6J6 converter tube (V3). Connect the high side of the signal generator to the free end.
Attenuate signal generator output to maintain not more than 2 volts on VTVM.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	Direct	High side to pin 5 (grid) of 6J6 (V3). Low side to tuner chassis.	Not used	44.0MC	Any	Use VTVM. DC probe to point (A). Common to chassis.	A1	Adjust for maximum deflection.
2.	"	"	"	43.25MC	"	"	A2	"
3.	"	"	"	44.85MC	"	"	A3	"
4.	"	"	43.5MC (10MC Swp)	41.25MC 42.25MC 45.75MC 47.25MC	"	Vert. Amp. thru detector (Fig.1) to pin 5 (plate) of 6CB6 (V4). Low side to chassis.	A4, A5, A6, A7, A8	Adjust for response curve similar to Fig.2. Adjust A4 for MINIMUM marker amplitude at 41.25MC. Adjust A5 and A6 to place the 45.75MC marker at 70% on response curve. Adjust A7 to place 42.25MC marker at 55% on response curve. Adjust A8 for MINIMUM marker amplitude at 47.25MC. Remove short lenght of wire attached to pin 5 of 6J6 (V3).

4.5MC TRAP ALIGNMENT

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
5.	Direct	High side to point (A). Low side to chassis.	Not used	4.5MC (400∿Mod)	Any	Vert. Amp. thru detector (Fig.1) to pin 11 (cathode) of picture tube. Low side to chassis.	A9	Adjust for MINIMUM 400∿ indication on scope.

SOUND IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use frequency modulated signal with 60∿ modulation and 450KC sweep. Use 120∿ sawtooth voltage in scope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
6.	Direct	High side to point (A). Low side to chassis.	4.5MC (450KC Swp)	4.5MC	Any	Vert. Amp. to point (B). Low side to chassis.	A10, A11	Disconnect stabilizing capacitor C5. Adjust for curve of maximum amplitude and symmetry similar to Fig. 3.
7.	"	"	"	"	"	Vert. Amp. to point (C). Low side to chassis.	A12	Reconnect stabilizing capacitor C5. Adjust so that 4.5MC occurs at center of crossover lines as in Fig. 4. SLIGHTLY retouch A-11 for maximum amplitude and straightness of crossover lines.

SOUND IF ALIGNMENT USING TV SIGNAL AND VTVM

Disconnect test equipment and replace V19 and V20 in their sockets. Connect antenna to VHF antenna terminals. Tune in a TV station and adjust for best picture.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
6.	Not used	Not used. Tune in a TV signal	Not used	Any station available	DC probe to point (A). Common to chassis.	A10, A11	Adjust for maximum deflection.
7.	"	"	"	"	DC probe to point (C). Common to chassis.	A12	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.

OSCILLATOR ALIGNMENT

Place the flat surface on the fine tuning control shaft downward.
The channel oscillator adjustment screws are reached thru a hole just to the right and slightly above the channel switch shaft.
The correct adjustment screw is accessible thru this hole as the channel switch is turned to each channel.
Tune in all available stations in the area and adjust the proper oscillator slug for clearest picture and best sound.

RF AND MIXER ALIGNMENT

This portion of the receiver has been aligned at the factory and is very stable. Alignment of this portion of the receiver should not be required in the field.

UHF TUNER ALIGNMENT

Alignment of the UHF tuner should not be attempted in the field. If the unit is known to be out of alignment or in need of major repair, the entire unit should be returned to the factory.

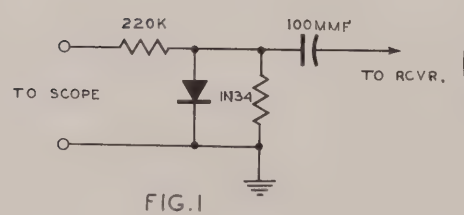

FIG.1

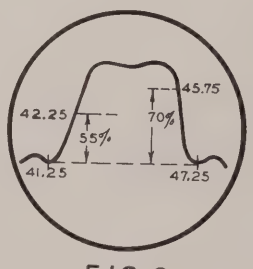

FIG. 2

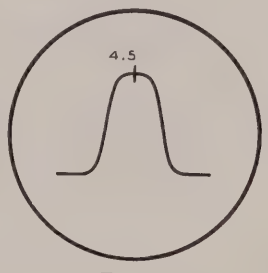

FIG. 3

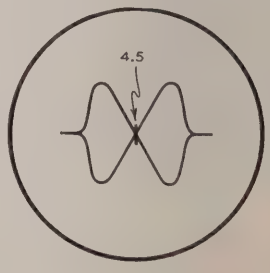

FIG. 4

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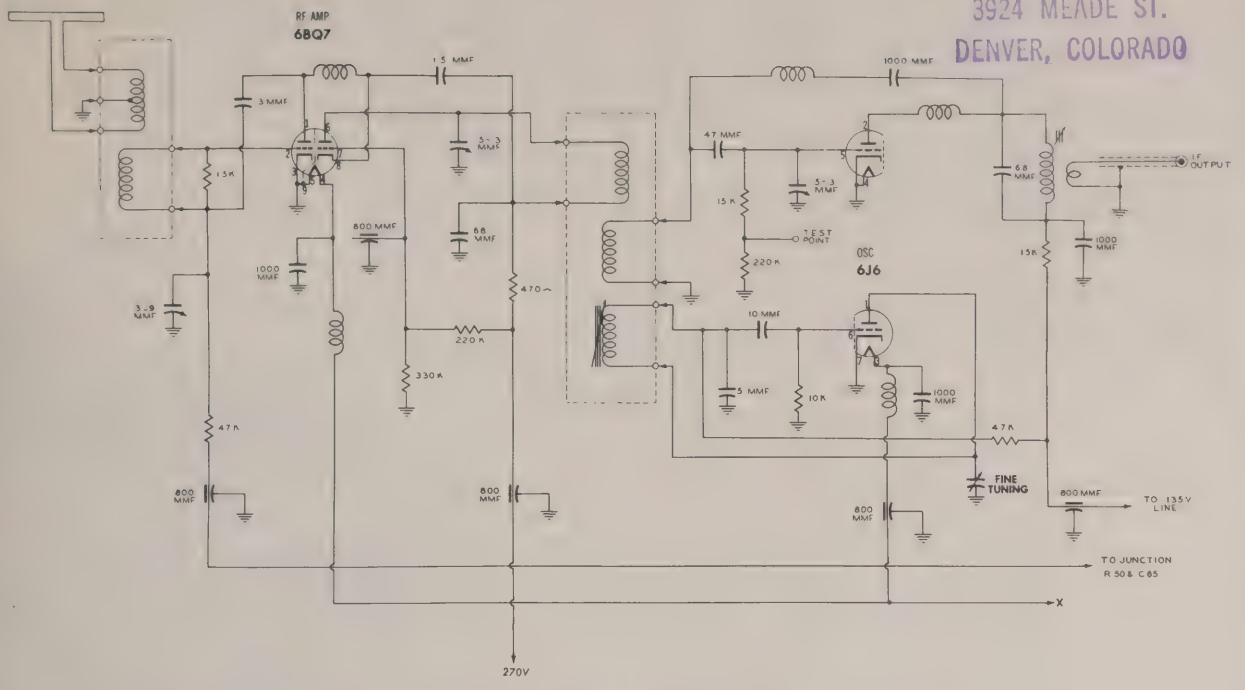

A PHOTOFACT STANDARD NOTATION SCHEMATIC
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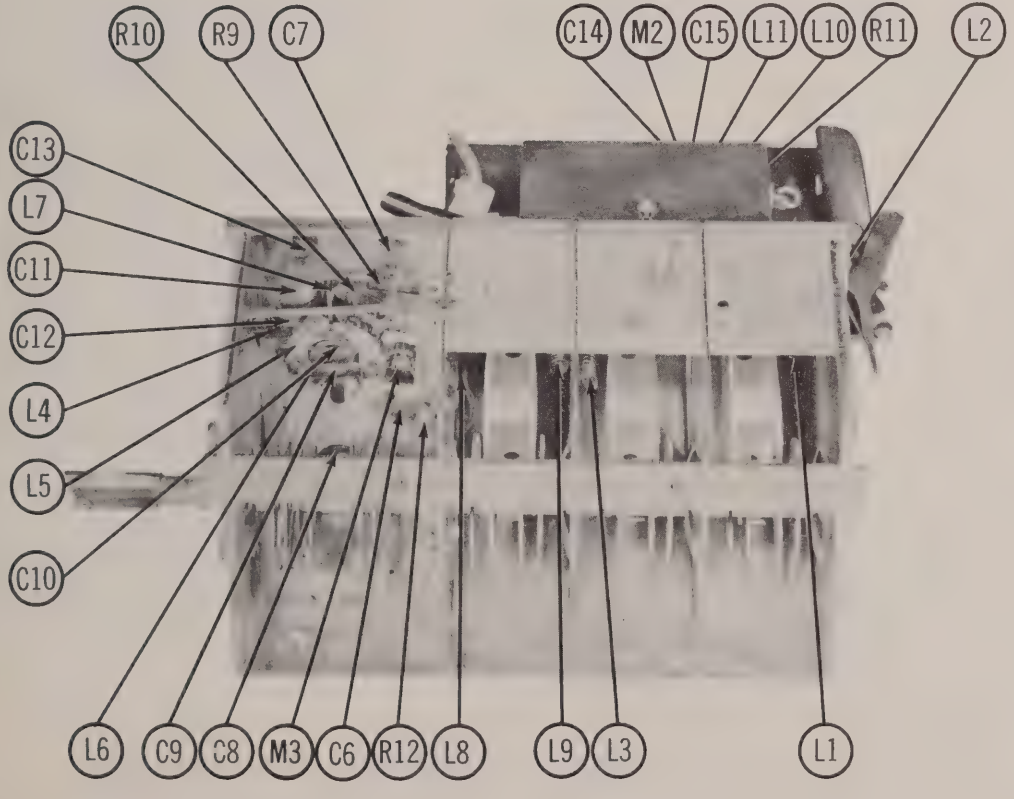
ALTERNATE VHF TUNER (PART NO. 8901297-1) USED ON SOME MODELS

ALTERNATE TUNER SCHEMATIC

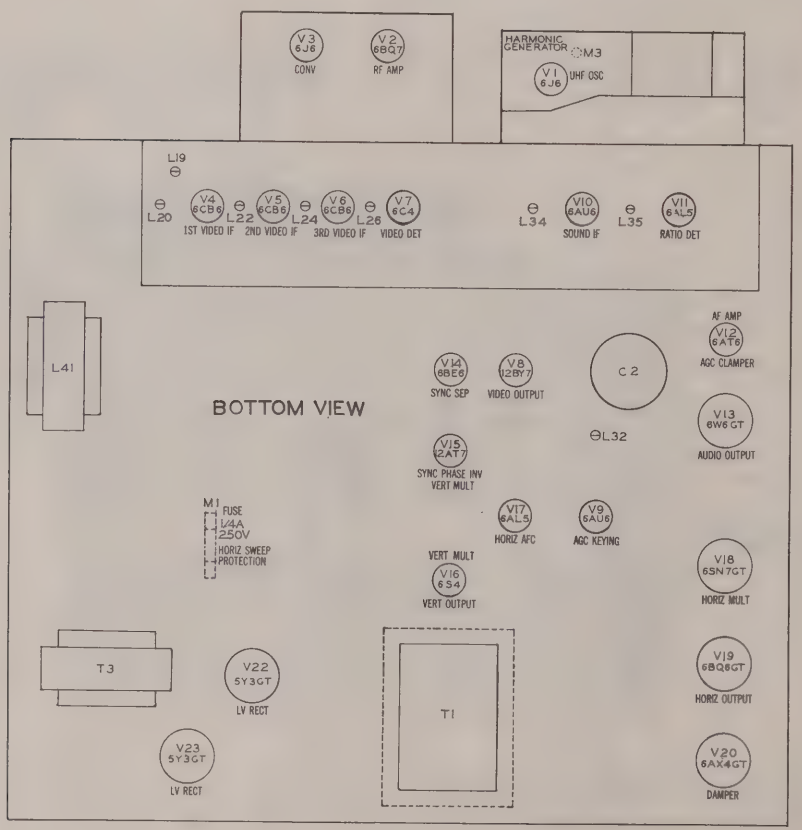


UHF TUNER

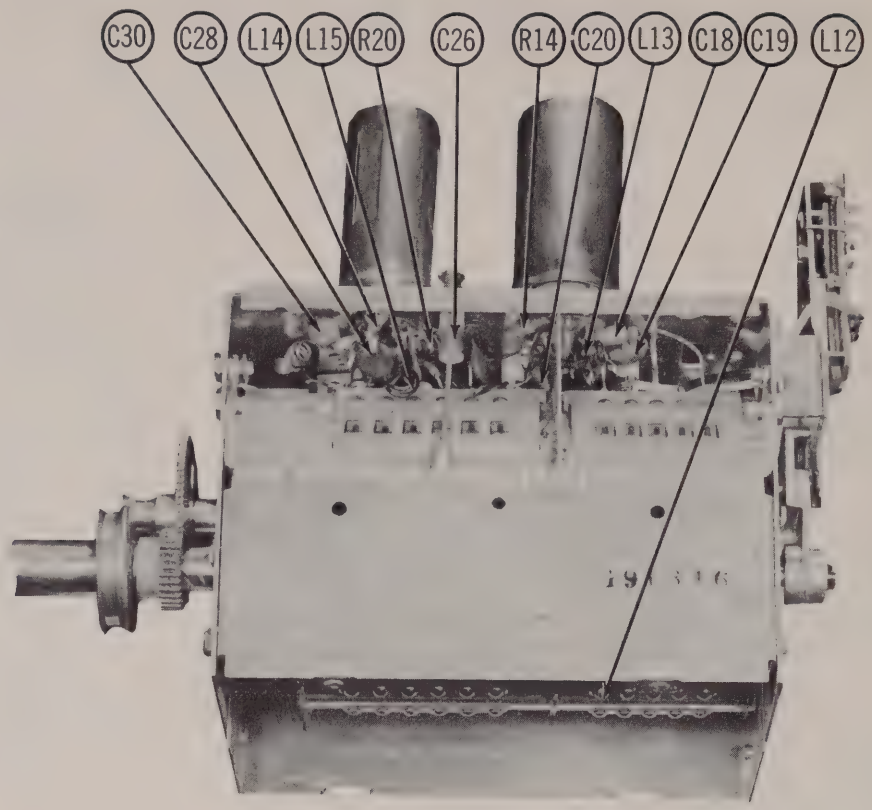
RESISTANCE MEASUREMENTS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6J6	▲■470Ω	▲■470Ω	0Ω	.1Ω	5.6KΩ	5.6KΩ	0Ω		
V 2	6BK7	INF	1.4Meg	0Ω	.1Ω	0Ω	†3.2KΩ	470KΩ	INF	0Ω
V 3	6J6	▲5KΩ	▲10.3KΩ	.1Ω	0Ω	190KΩ	10KΩ	0Ω		
V 4	6CB6	120KΩ	47Ω	.1Ω	0Ω	▲470Ω	†13KΩ	0Ω		
V 5	6CB6	100KΩ	47Ω	.1Ω	0Ω	▲470Ω	†13KΩ	0Ω		
V 6	6CB6	.3Ω	180Ω	.1Ω	0Ω	▲470Ω	▲470Ω	0Ω		
V 7	6C4	2.2Meg	INF	.1Ω	0Ω	2.2Meg	3.3KΩ	.3Ω		
V 8	12BY7	33Ω	3.3KΩ	0Ω	0Ω	0Ω	.1Ω	†7.1KΩ	†20.2KΩ	0Ω
V 9	6AU6	†32KΩ	†5.1KΩ	.1Ω	0Ω	540KΩ	†45Ω	†5.1KΩ		
V 10	6AU6	2Ω	0Ω	0Ω	.1Ω	▲1KΩ	▲1KΩ	220Ω		
V 11	6AL5	INF	INF	.1Ω	0Ω	15KΩ	0Ω	15KΩ		
V 12	6AT6	10Meg	0Ω	0Ω	.1Ω	1.4Meg	900KΩ	†570KΩ		
V 13	6W6GT	INF	.1Ω	†575Ω	†265Ω	†360KΩ	†100KΩ	0Ω	2Meg	
V 14	6BE6	36KΩ	0Ω	.1Ω	0Ω	30KΩ	▲22KΩ	2.4Meg		
V 15	12AT7	†7KΩ	†1Meg	680Ω	.1Ω	.1Ω	◓2.5Meg	1.5Meg	1KΩ	0Ω
V 16	6S4	INF	2.7KΩ	2.2Meg	0Ω	.1Ω	2.2Meg	INF	INF	◓5KΩ
V 17	6AL5	12Ω	12Ω	.1Ω	0Ω	4.8Meg	0Ω	4.8Meg		
V 18	6SN7GT	5.4Meg	†8.3KΩ	1.8KΩ	70KΩ	†270KΩ	1.8KΩ	0Ω	.1Ω	
V 19	6BQ6G	INF	0Ω	470KΩ	5.1KΩ	470KΩ	INF	.1Ω	0Ω	TOP CAP ◓26Ω
V 20	6AX4GT	INF	INF	800KΩ	INF	†53Ω	INF	0Ω	.1Ω	
V 21	1B3GT		PINS	1 - 8	HAVE	INF	RESISTANCE			TOP CAP ◓480Ω
V 22	5Y3GT	INF	50KΩ	INF	24Ω	INF	24Ω	INF	50KΩ	
V 23	5Y3GT	INF	50KΩ	INF	24Ω	INF	24Ω	INF	50KΩ	
V 24	21FP4A	0Ω	†1.8Meg	PIN 6 †45Ω	PIN 10 ◓3.3KΩ	PIN 11 †100KΩ	PIN 12 .1Ω			

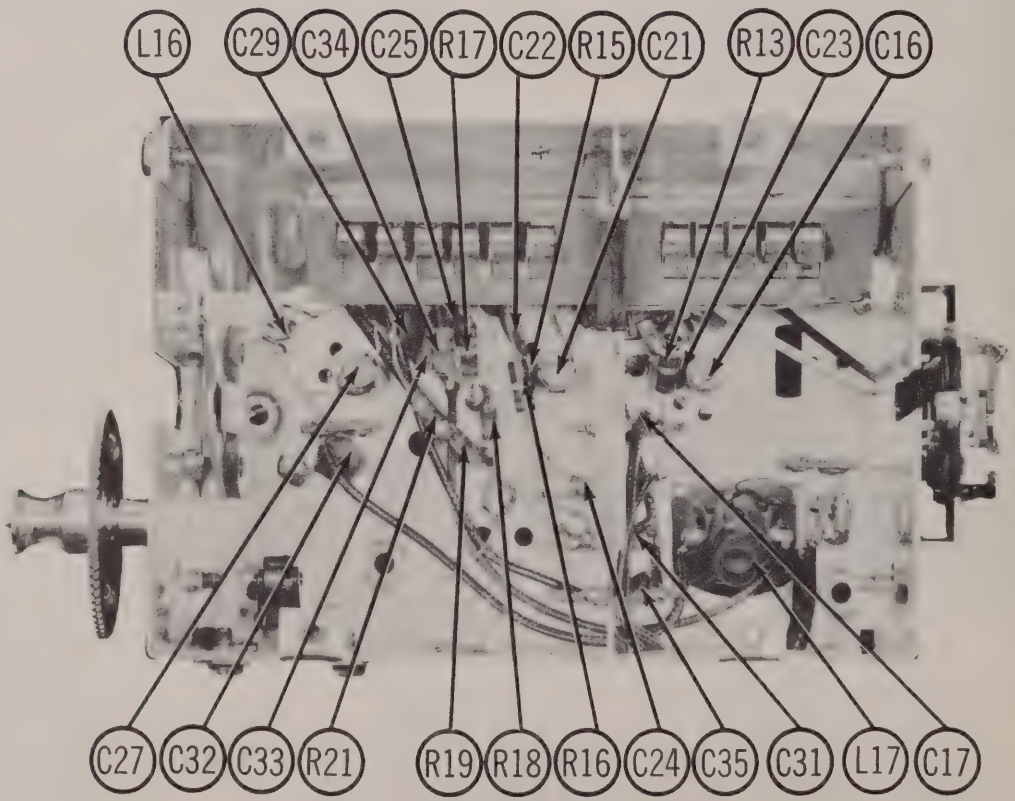
■ MEASURED IN UHF POSITION
▲ MEASURED FROM 125V LINE
† MEASURED FROM PIN 8 OF V23
◓ MEASURED FROM PIN 3 OF V20



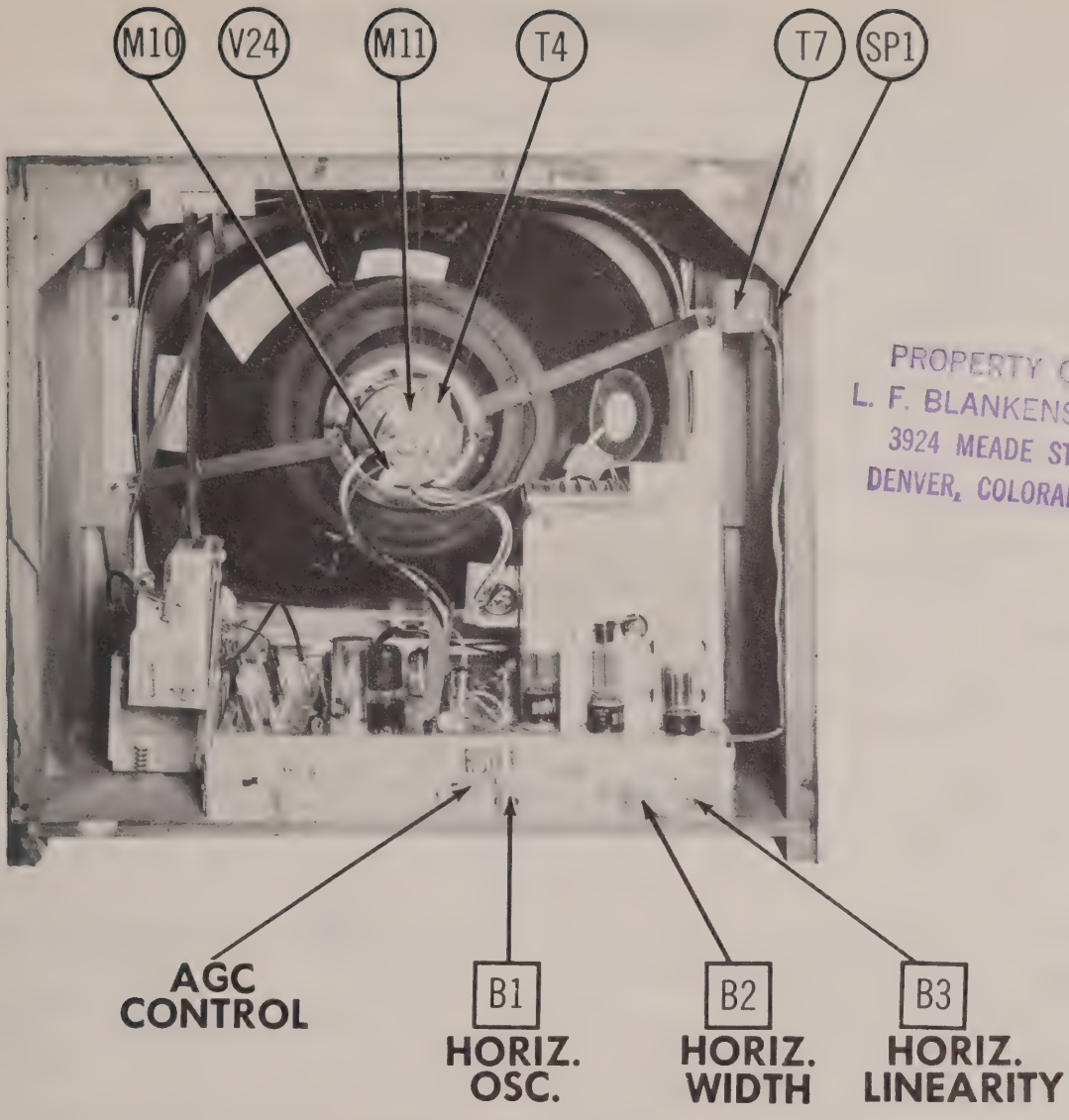
TUBE PLACEMENT CHART



VHF TUNER-RIGHT SIDE



VHF TUNER-BOTTOM VIEW



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CABINET—REAR VIEW

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Set the horizontal hold control to its mid-range position.

Adjust the horizontal oscillator slug (B1) to the center of its effective synchronizing range then momentarily remove signal by switching off channel and back again. Picture should pull into sync. If picture does not pull into sync readjust B1 slightly until picture pulls into sync. Repeat procedure until proper pull-in is obtained.

Adjust the horizontal width slug (B2) for a picture that is slightly wider than necessary to fill the picture mask horizontally.

Adjust the horizontal linearity slug (B3) for a picture that is symmetrical from left to right.

Adjust the picture stabilizer control (R4B) for a steady picture.

TROUBLE SHOOTING AIDS

SWEEP

HORIZONTAL

LOSS OF SWEEP

Follow procedure outlined under "Loss of High Voltage".

INSUFFICINET SWEEP

Check by substitution V18, V19, V20, "V22 and V23. Check adjustments B2 and B3. Check waveform W16.

If Satisfactory	If Unsatisfactory
Check C4, R121, R122, R118, C97, R100, T2, T4A and other associated circuit components.	Check C103, C104, R111, R112, R114 and other associated components.

DRIVE LINES

Check by substitution V18, V19 and V20. Check C103, C104, R112, R114, C110, C106, C107, R100, T2, T4A and other associated circuit components.

COMPRESSED LEFT SIDE

Check by substitution V18, V19 and V20. Check adjustments B2 and B3. Check components associated with the horizontal output and damper stages especially T2 and T4A.

FOLDS

Follow procedure outlined under "Drive Lines".

PIE CRUST EFFECT

Check C99 for open. Check V19 and V20 for internal arcing.

XMAS TREE EFFECT

Substitute V18. Check C100, C101, C102, L37 and other associated components for failure or change of value.

VERTICAL

LOSS OF SWEEP

Check by substitution V15 and V16. Check waveform W10.

If Satisfactory	If Unsatisfactory
Check T3, T4B, R96, R2 and other associated circuit components.	Check R94, R95, R91, R6, C87, C88 and other associated circuit components.

INSUFFICIENT SWEEP

Check adjustment of height and vertical linearity controls. Proceed as outlined under "Loss of Sweep".

COMPRESSED AT BOTTOM

Check by substitution V15 and V16. Check T3, T4B, C2A and other associated components.

COMPRESSED AT TOP

Check by substitution V15 and V16. Check C87, C88, R94, R95 and other associated circuit components.

FOLDS

Check by substitution V15 and V16. Check associated components especially T3, T4B, C87, C88, R94 and R95.

SYNC

LOSS OF VERTICAL AND HORIZONTAL SYNC

Check by substitution V14 and V15. Check components associated with V14 and V15A especially C80, C83, R78, R80, R82, R83, R84 and R85 for failure or change of value.

LOSS OF VERTICAL SYNC-HORIZONTAL SYNC SATISFACTORY

Check by substitution V14 and V15. Check waveform W8.

If Satisfactory	If Unsatisfactory
Check components associated with V15B.	Check vertical integrator and other associated components. Check video IF stages for overloading.

LOSS OF HORIZONTAL SYNC - VERTICAL SYNC SATISFACTORY

Check by substitution V17 and V18. Check waveform W13.

If Satisfactory	If Unsatisfactory
Check components associated with V18.	Check R101, R102, C95 and C96.

HORIZONTAL BENDING

Check by substitution V17, V18 and V19. Check the horizontal AFC filter network for component failure or change of value.

VIDEO

LOSS OF VIDEO

Check by substitution V8 and V9. Check contrast control, picture tube and other associated components. Check AGC network.

SOUND BARS (4.5MC BEAT)

Adjust tuner fine tuning for best picture and sound. Check adjustment A9. Check video IF alignment.

POOR CONTRAST

Check by substitution V7 and V8. Check contrast control, picture tube and associated circuit components.

NEGATIVE PICTURE

Check adjustment of the AGC delay control. Check by substitution V7, V8, V9, V2, V4 and V5. Check AGC network components. Check picture tube.

SMEAR

Check by substitution V7 and V8. Check peaking coils associated with V7 and V8. Check contrast control, C60, R43, R45, R46, picture tube and other associated circuit components.

WIDE BLACK BAR ACROSS PICTURE

Check V2, V4, V5, V6 and V8 for heater to cathode leakage. Inc case of UHF check V1.

AUDIO

WEAK OR NO SOUND

Check by substitution V10, V11, V12 and V13. Check stages V12A and V13 using audio signal generator. Apply audio signal across R70.

If Satisfactory	If Unsatisfactory
Check ratio detector and audio IF alignment and components.	Check components associated with V12A and V13 especially C77, R71, R72 and T7.

BUZZ

Adjust tuner fine tuning for best picture and sound. Adjust A12 for minimum buzz. If still unsatisfactory, substitute V11 and realign audio IF and ratio detector stages. Check C5 for leakage.

DISTORTED

Follow procedure outlined under "Weak or No Sound".

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA		RETMA BASE TYPE	NOTES
		DUMONT PART No.	STANDARD REPLACEMENT		
V1	UHF Oscillator	6J6	6J6	7BF	
V2	RF Amplifier	6BQ7	6BQ7	9AJ	
V3	Converter	6J6	6J6	7BF	
V4	1st. Video IF Amp.	6CB6	6CB6	7CM	
V5	2nd. Video IF Amp.	6CB6	6CB6	7CM	
V6	3rd. Video IF Amp.	6CB6	6CB6	7CM	
V7	Video Detector	6C4	6C4	6BG	
V8	Video Output	12BY7	12BY7	9BF	
V9	AGC Keying	6AU6	6AU6	7BK	
V10	Sound IF Amp.	6AU6	6AU6	7BK	
V11	Ratio Detector	6AL5	6AL5	6BT	
V12	AF Amplifier-AGC Clamper	6AT6	6AT6	7BT	
V13	Audio Output	6W6GT	6W6GT	7S	
V14	Sync Separator	6BE6	6BE6	7CH	
V15	Sync Phase Inv.-Vert. Mult.	12AT7	12AT7	9A	
V16	Vert. Mult.-Vert. Output	6S4	6S4	9AC	
V17	Horiz. AFC	6AL5	6AL5	6BT	
V18	Horiz. Mult.	6SN7GT	6SN7GT	8BD	
V19	Horiz. Output	6BQ6GT	6BQ6GT	6AM	
V20	Damper	6AX4GT	6AX4GT	4CG	
V21	HV Rectifier	1B3GT	1B3GT	3C	
V22	LV Rectifier	5Y3GT	5Y3GT	5T	Note: Chassis RA-306 uses a single 5U4G in this application
V23	LV Rectifier	5Y3GT	5Y3GT	5T	

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CATHODE-RAY TUBE

ITEM No.	REPLACEMENT DATA				RETMA BASE TYPE	NOTES
	DUMONT PART No.	SYLVANIA PART No.	GENERAL ELECTRIC PART No.	WESTINGHOUSE PART No.		
V24A	21FP4A	21FP4A	21FP4A	21FP4A	12L	① Circuit changes necessary.
		21FP4①	21FP4 ①	12FP4 ①	12M	
B	17HP4	17HP4	17HP4	17HP4	12L	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	DUMONT PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C1A	▲40	400	03121080	AFH2-64		C035		FP378	TVL-2679	
B	▲120	400		PRS450/40		BR4045		TC75		
C2A	10	50	03124180	AFH3-41		D016		FP396.2	TVL-4664	
B	■10	400		PRS50/10				TC32		
C	▲10	400								
D	▲40	200								
C3	10	350	03250421	E26D190					R1468	Note 1
C4	4	400	03115080	PRS450/4		BR445		TC70	TVA-1702	
C5	5	50	03120960	PRS150/4		BR550		TC30	TVA-1303	
C6	10		03125110							
C7	800		03125500	EF-001	MFT-1000				503C-D1	
C8	.7-2		03125180		829-3		3115-01-0R5	CT565A		
C9	4.7		03126140				N330-331-4R7			
C10	4.7		03126140				N330-331-4R7			
C11	4.7		03014560							
C12	800		03125500	BPD-0008	DD-801	K069	801-001	DC-521	5HK-D1	
C13	800		03125500	EF-001	MFT-1000				503C-D1	
C14	33		03126130	SI33NP0	TCZ-33	Z029	NP0K-330	ZT-5433	5TCC-Q33	
C15	10		03125460	SI10NP0	TCZ-10	Z018	NP0K-100	ZT-541	5TCC-Q1	
C16	1-3		03019840				3115-01-10			
C17	1000		03125500	EF-001	MFT-1000				503C-D1	
C18	1.8		03125010							
C19	5		03124780	SI5NP0	TCZ-4.7	Z011	NP0K-050	ZT-555	5TCCB-V47	
C20	800		03124790	BPD-0008	DD-801	K069	801-001	DC-521	5HK-D1	
C21	.7-2		03124770		829-3		3115-01-0R5	CT565A		
C22	47		03119170	BPD-000047	D6-470	G033	GP1K-470	UC-5447	5GA-Q47	
C23	800		03124790	BPD-0008	DD-801	K069	801-001	DC-521	5HK-D1	
C24	1000		03125500	EF-001	MFT-1000				503C-D1	
C25	47		03119170	BPD-000047	D6-470	G033	GP1K-470	UC-5447	5GA-Q47	
C26	1-3		03019840				3115-01-10			
C27	1-3		03019840				3115-01-10			
C28	10		03126010	SI10N750	TCN-10	N018	N750K-100	NT-541	5TCU-Q1	
C29	10		03126010	SI10N750	TCN-10	N018	N750K-100	NT-541	5TCU-Q1	
C30	800		03124790	BPD-0008	DD-801	K069	801-001	DC-521	5HK-D1	
C31	1000		03125500	EF-001	MFT-1000				503C-D1	
C32	10		03125110	SI10NP0	TCZ-10	Z018	NP0K-100	ZT-541	5TCC-Q1	
C33	10		03125110	SI10NP0	TCZ-10	Z018	NP0K-100	ZT-541	5TCC-Q1	
C34	1.5		03125000	SI1.5NP0	TCZ-1.5	Z004	NP0K-1R5	ZT-5515	5TCCB-V15	
C35	1000		03125500	EF-001	MFT-1000				503C-D1	
C36	1000		03100490	BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C37	1000		03100490	BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C38	5000		03015610	BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C39	.5-3		03137300		829-3		3115-01-0R5	CT565A		
C40	1000		03100490	BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C41	1		03012150	SI1NP0	TCZ-1	TZ03	NP0K-010		5TCCB-V1	
C42	27		03131320	SI27NP0	TCZ-27	TZ16	NP0K-270	ZT-5427	5TCC-Q27	
C43	5000		03015610	BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C44	1.0	100	03122800	484-1.0		CUB2W1		PT41	2TM-M1	
C45	1500		03017850	BPD-0015	DD-152	K071	801-0015	DC-5215	5HK-D15	
C46	680		03121520	SI680	D6-681	TP50	GP2K-681	UC-5368	5GA-T68	
C47	1500		03017850	BPD-0015	DD-152	K071	801-0015	DC-5215	5HK-D15	
C48	1500		03017850	BPD-0015	DD-152	K071	801-0015	DC-5215	5HK-D15	
C49	680		03121520	SI680	D6-681	TP50	GP2K-681	UC-5368	5GA-T68	
C50	470		03121560	SI470	D6-471	TP46	GP2K-471	UC-5347	5GA-T47	
C51	680		03121520	SI680	D6-681	TP50	GP2K-681	UC-5368	5GA-T68	
C52	1500		03017850	BPD-0015	DD-152	K071	801-0015	DC-5215	5HK-D15	
C53	1000		03100490	BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C54	5		03014610	SI5NP0	TCZ-4.7	TZ07	NP0K-050	ZT-555	5TCCB-V47	

PARTS LIST AND DESCRIPTIONS (Continued)

CAPACITORS (cont)

ITEM No.	RATING CAP	RATING VOLT	DUMONT PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C55	5		03014610	SI5NP0	TC2-4.7	TZ0T	NP0K-050	ZT-555	5TCCB-V47	
C56	.015	200	03126810	P288-015		CUB6S15			6TM-S15	
C57	47		03015790	SI47NP0	TC2-47	TZ2J	NP0K-470	ZT-5447	5TCC-Q47	
C58	33		03131330	SI33NP0	TC2-33	TZ1S	NP0K-330	ZT-5433	5TCC-Q33	
C59	15		03117310	SI15NP0	TC2-15	TZ1J	NP0K-150	ZT-5415	5TCC-Q15	
C60	.047	400	03127620	P488-1	DF-104	CUB4P1		PT401	4TM-P1	
C61	.047	200	03126840	P288-047	DF-503	CUB2S47		PT447	2TM-S47	
C62	3000	2000	03122420	HVD30-001			3KV-102		20GA-D1	
C63	.02	200	03126880	P488-22		CUB4P22		PT4022	4TM-P22	
C64	.022	200	03126540	P488-022	DF-203	CUB4S22		PT4122	4TM-S22	
C65	2.5	200	03126800	P288-1	DF-104	CUB2P1		PT401	2TM-P1	
C66	47		03014540	SI2.2NP0	TC2-2.2	TZ0S	NP0K-2R2		5TCCB-V22	
C67	47		03015760	SI47NP0	TC2-47	TZ2J	NP0K-470	ZT-5447	5TCC-Q47	
C68	10000		03015920	BPD-01	DD-103	K082	81L-01	DC-5U	5HK-S1	
C69	10000		03015920	BPD-01	DD-103	K082	81L-01	DC-5U	5HK-S1	
C70	5000		03015610	BPD-005	DD-502	K080	81L-005	DC-525	5HK-D5	
C71	680		03121520	SI680	D6-681	TP50	GP2K-681	UC-5368	5GA-T68	
C72	.0033	500	03128110	P488-0033	D6-332	CUB4D33	GP2-333-332	PT6233	6TM-D33	
C73	33	200	03126800	P488-01	D6-103	CUB4S1	GP2-333-103	PT611	6TM-S1	
C74	.033	200	03126560	P488-033		PM4S33		PT4133		
C75	.005		03004490	BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C76	2200		03124190	BPD-0022	DD-222	K073	801-0022	DC-532	5HK-D22	
C77	20000		03122430	BPD-02	DF-203	K085		PT612	5HK-S2	
C78	.1	400	03128220	P488-1	DF-104	CUB4P1		PT601	6TM-P1	
C79	5000		03015610	BPD-005	DD-502	K080	81L-005	DC-525	5HK-D5	
C80	022	600	03128180	P888-022	DF-203	CUB6S22		PT6122	6TM-S22	
C81	120		03104190	SI330	D6-331	TP43	GP2K-331	UC-5333	5GA-T33	
C82	1	200	03126860	P288-1	DF-104	CUB2P1		PT401	2TM-P1	
C83	022	400	03127580	P488-022	DF-203	CUB4S22		PT4122	4TM-S22	
C84	002							PT622		
B	005		*88000631	*PA-110	*PC-100	*81T7M1	*81405-01	PT623	*10IC1	
C	005							PT625		
C85	.0022	400	03127040	P888-0022	D6-222	CUB6D22	GP2-333-222	PT6222	6TM-D22	
C86	.01	200	03126800	P488-01	D6-103	CUB4S1	GP2-333-103	PT411	6TM-S1	
C87	.047	400	03127900	P488-047	DF-503	CUB4S47		PT4147	4TM-S47	
C88	1	200	03128210	P288-1	DF-104	CUB6P1		PT601	6TM-P1	
C89	.01	1600	03129630	P888-01	DD16-103	CUB16S1		PT161	M8-S1	
C90	.0022	400	03127040							
C91	4.0	3000	03122440	HVD30-00047			3KV-471		20GA-T47	
C92	.01	600	03128160	P888-01	D6-103	CUB6S1	GP2-333-103	PT611	6TM-S1	
C93	1	200	03126860	P288-1	DF-104	CUB2P1		PT401	2TM-P1	
C94	1	200	03126860	P288-1	DF-104	CUB2P1		PT401	2TM-P1	
C95	.001	600	03128100	P888-001	D6-102	CUB6D1	GP2L-102	PT621	6TM-D1	
C96	.001	600	03128100	P888-001	D6-102	CUB6D1	GP2L-102	PT621	6TM-D1	
C97	.05	400	03141830			PM6P15				
C98	.0033	500	03127530	P888-0033	D6-332	CUB6D33	GP2-333-332	PT6233	6TM-D33	
C99	.033	200	03126830	P488-033		PM4S33		PT4133		
C100	4700	500	03033340	1464-005		1R5D47		MCB405	M8-S5	
C101	.02		03121530	SI2UNP0	TC2-20	TZ1S	NP0K-200	ZT-5A2	5TCC-Q2	
C102	390	500	03021110	1469-0004		5R5T39		MCB243	M3-S4	
C103	390	500	03020500	1469-0004		5R5T39		MCB243	M3-S4	
C104	.0047	400	03128140	P588-0047	D6-472	CUB6D47	GP2-333-472	PT6247	6TM-D47	
C105	.0020		03015920	BPD-01	DD-103	K082	81L-01	DC-5U	5HK-S1	
C106	5000		03015610	BPD-005	DD-502	K080	81L-005	DC-525	5HK-D5	
C107	.033	600	03127880	P688-033		PM6S33		PT6133		
C108	1000	2000	03122420	HVD30-001			3KV-102		20GA-D1	
C109	.1	200	03126820							
C110	75	1500	03122464							
C111	.01	600	03125780	689ZX-01	D6-103	CUB6S1	GP2-333-103	PT611	6TM-S1	
C112	.01	600	03125780	689ZX-01	D6-103	CUB6S1	GP2-333-103	PT611	6TM-S1	

Note 1. C3 is a semi-polarized unit. Replacement must be of same type.
• Items C84A, C84B, C84C, R88A, R88B, R88C are combined in one unit.

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	DUMONT PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	1 Meg		01053132	* QJ-543	RTV-89		UF16L	Brightness-Panel
B	1 Meg						UR16-T1253	Volume tapped at 50K -Rear
C	Switch						US-26	Attach to R1B
R2A	500Ω		01058801	QII-114	A47-5000-S	AB-10	U-14	Vert. Linearity
B	Shaft		Not Req.	Not Req.	FKS-1/4	AK-1	Not Req.	Attach to R2A
R3A	50KΩ		01058003	**QJ-542	RTV-453		UF54L	Horiz. Hold -Panel
B	1.5Meg with 40KΩ stop						UR36L	Vert. Hold-Rear Note 1
R4A	1 Meg		01038347	*QJ-541	RTV-452		UF16A	Tone - Panel
B	5 Meg						UR56L	Picture stabilizer-Rear
R5A	15KΩ		01057300	QII-168XX				Contrast tapped at 6K & 4K
B&A	3 Meg		01051010	QII-140	A47-5 Meg6	AB-84	SU-59	Vert. Size
B	Shaft		Not Req.	Not Req.	FKS-1/4	AK-1	Not Req.	Attach to R5A
R7A	100KΩ		01053800	QII-128	A47-100K-S	AB-40	SU-41	AGC
B	Shaft		Not Req.	Not Req.	FKS-1/4	AK-1	Not Req.	Attach to R7A
R8A	1 Meg		01051010	QII-140	A47-5 Meg6	AB-84	SU-59	RF AGC delay
B	Shaft		Not Req.	Not Req.	FKS-1/4	AK-1	Not Req.	Attach to R8A

† Universal replacement (Mallory exact duplicate part #UR16Q1).
• CONCENTRIKIT EQUIVALENT KIT K-2 BASE ELEMENTS & SHAFTS B11-137 & P6-122 (Panel)
B17-137X & RI-207 (Rear) & SWITCH 76-1
** CONCENTRIKIT EQUIVALENT KIT K-2 BASE ELEMENTS & SHAFTS B11-123 & P1-023 (Panel)
B11-138 & R12-108 (Rear)
■ CONCENTRIKIT EQUIVALENT KIT K-3 BASE ELEMENTS & SHAFTS B13-137 & P1-028 (Panel)
B11-141 & R12-108 (Rear)
Note 1. Connect a 47KΩ resistor in series with the left hand terminal of the control and the lead connecting to the same terminal of the original control (control viewed from shaft end, terminals down.

RESISTORS

ITEM No.	RATING OHMS	RATING WATT	DUMONT PART No.	IRC PART No.	NOTES
R9	5600Ω	1	03031890	BTS-5600	
R10	470Ω	1	03031730	BTS-470	
R11	470Ω	1	03031610	BTS-47	
R12	270Ω	1	03031700	BTS-270	
R13	3900Ω	1	03031840	BTS-3900	
R14	820KΩ 5%	1	03041080	BTS-820K 5%	
R15	1 Meg 5%	1	03041200	BTS-1 Meg 5%	
R16	470Ω	1	03041730	BTS-470	
R17	10KΩ	1	03031890	BTS-10K	
R18	180KΩ	1	03032040	BTS-180K	
R19	10KΩ	1	03031890	BTS-10K	
R20	10KΩ	1	03031890	BTS-10K	
R21	4700Ω	1	03031850	BTS-4700	
R22	2700Ω	1	03034820	BTA-2700	
R23	270Ω	1	03031700	BTS-270	
R24	22KΩ	1	03031930	BTS-22K	
R25	47Ω	1	03031610	BTS-47	
R26	1000Ω	1	03032420	BTS-1000	
R27	470Ω	1	03032400	BTS-470	
R28	1000Ω	1	03031770	BTS-1000	
R29	56KΩ 5%	1	03031980	BTS-56K 5%	
R30	47Ω	1	03031610	BTS-47	
R31	1000Ω	1	03032420	BTS-1000	
R32	470Ω	1	03032400	BTS-470	
R33	22KΩ	2	03037930	BTB-22K	
R34	27KΩ	2	03037940	BTB-27K	
R35	56KΩ 5%	2	03037980	BTB-56K 5%	
R36	180Ω	1	03031680	BTS-180	
R37	470Ω	1	03031700	BTS-470	
R38	4700Ω	1	03031850	BTS-4700	
R39	3300Ω	1	03031830	BTS-3300	
R40	33Ω	1	03031590	BTS-33	
R41	8200Ω	1	03031890	BTS-8200	
R42	8200Ω	1	03031880	BTS-8200	
R43	7000Ω	10	02113090		
R44	1800Ω	1	03031800	BTS-1800	
R45	120KΩ	1	03032020	BTS-120K	
R46	270KΩ	1	03032060	BTS-270K	
R47	15KΩ	1	03032600	BTS-15K	Note 1
R48	1 Meg	1	03032130	BTS-1 Meg	
R49	100KΩ	1	03032010	BTS-100K	
R50	470KΩ	1	03032050	BTS-470K	Note 2
R51	470KΩ 5%	2	03032120	BTS-470K 5%	
R52	3.6Meg 5%	2	02113340	BTS-3.6Meg 5%	Note 3
R53	390KΩ 5%	1	03031100	BTS-390K 5%	
R54	100KΩ 5%	1	03030980	BTS-100K 5%	
R55	18KΩ 5%	1	03031940	BTS-18K 5%	Note 4
R56	47KΩ	1	03031970	BTS-47K	
R57	10KΩ	1	03031890	BTS-10K	
R58	39KΩ	1	03031960	BTS-39K	
R59	39KΩ	1	03031960	BTS-39K	
R60	68KΩ	1	03034990	BTA-68K	
R61	47KΩ	1	03031870	BTS-47K	
R62	22ΩΩ	1	03031690	BTS-220	
R63	1000Ω	1	03032420	BTS-1000	
R64	390Ω	1	03031720	BTS-390	
R65	22KΩ	1	03031930	BTS-22K	
R66	15KΩ	1	03031910	BTS-15K	
R67	15KΩ	1	03031910	BTS-15K	

ITEM No.	RATING OHMS	RATING WATT	DUMONT PART No.	IRC PART No.	NOTES
R68	3.3Ω	1	02100770		
R69	12KΩ	1	03031900	BTS-12K	
R70	10 Meg	1	03032580	BTS-10 Meg	
R71	470KΩ	1	03032580	BTS-470K	
R72	510KΩ 5%	1	03031130	BTS-510K 5%	
R73	100KΩ	1	03032010	BTS-100K	
R74	680KΩ 5%	1	03031160	BTS-680K 5%	
R75	220Ω	2	03038380		
R76	33KΩ	1	03031950	BTS-33K	
R77	560KΩ	1	03032100	BTS-560K	
R78	15KΩ	1	03031810	BTS-15K	
R79	220KΩ	1	03032050	BTS-220K	
R80	2.2Meg	1	03032170	BTS-2.2Meg	
R81	22KΩ	2	03037930	BTB-22K	
R82	100KΩ	1	03032010	BTS-100K	
R83	33KΩ	1	03031950	BTS-33K	
R84	1 Meg	1	03032600	BTS-1 Meg	
R85	680Ω	1	03030440	BTS-680	
R86	1200Ω	1	03031780	BTS-1200	
R87	680Ω 5%	1	02030440	BTS-680 5%	
R88A	22KΩ			BTS-22K	
B	8200Ω		• 88000631	BTS-8200	
C	8200Ω			BTS-8200	
R89	680KΩ	1	03032120	BTS-680K	Note 5
R90	1000Ω	1	03031770	BTS-1000	
R91	1.2Meg	1	03032140	BTS-1.2Meg	
R92	330KΩ	1	03034070	BTA-330K	
R93	68KΩ	1	03034990	BTA-68K	
R94	15KΩ 5%	1	03030760	BTS-15K 5%	
R95	2.2Meg	1	03032632	BTS-2.2Meg	
R96	820Ω	1	03034780	BTA-820	
R97	47KΩ	1	03034970	BTA-47K	
R98	560Ω	1	03031740	BTS-560	
R99	560Ω	1	03031740	BTS-560	
R100	15KΩ	2	03038490	BTB-15K	
R101	100KΩ	1	03032010	BTS-100K	
R102	100KΩ	1	03032010	BTS-100K	
R103	4.7Meg	1	03032210	BTS-4.7Meg	
R104	680KΩ	1	03032110	BTS-680K	
R105	12Ω	1	03034540		
R106	1800Ω 5%	1	03030540	BTS-1800 5%	
R107	8200Ω 5%	1	03030700	BTS-8200 5%	
R108	100KΩ	1	03032010	BTS-100K	
R109	270KΩ	1	03032060	BTS-270K	
R110	82KΩ	1	03032000	BTS-82K	
R111	270KΩ	1	03032060	BTS-270K	
R112	6200Ω 5%	1	03032870	BTS-6200 5%	
R113	56Ω	1	03032350		
R114	470KΩ	1	03032580	BTS-470K	
R115	2.2Meg	1	03032620	BTS-2.2Meg	
R116	6.8Meg	1	03032850	BTS-6.8Meg	
R117	7500Ω	7	03032600	1 3/4A-750	
R118	4000Ω	10	02113050	1 3/4A-4000	
R119	3300Ω	2	03037830	BTA-3300	
R120	100KΩ	1	03033540	BTA-100K	
R121	2200Ω	1		BTA-2200	Note 6
R122	2200Ω	1		BTA-2200	Note 6
R123	100KΩ	1		BTS-100K	Note 7

Note 1. Some models may use a 1 Meg resistor in this application.
Note 2. Some models may use a 330KΩ resistor in this application.
Note 3. Some models may use a 3.9 Meg resistor in this application.
Note 4. Some models may use a 27KΩ resistor in this application.
Note 5. Some models may use a 820KΩ resistor in this application.
Note 6. Not used in all models.
Note 7. Some models may use a 33KΩ resistor in this application.
• Items R88A, R88B, R88C, C84A, C84B, C84C are combined in one unit.

TRANSFORMER (POWER)

ITEM No.	RATING PRI.	RATING SEC. 1	RATING SEC. 2	DUMONT PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	RCA TYPE No.	Halldorson PART No.	Thordarson PART No.
T1	117VAC @ 1.75A	586VCT @ .240ADC	5VAC @ 4A	20008771			R-61BC ①			
	SEC. 3	SEC. 4	SEC. 5							
	6.3VAC @ .30A	6.3VAC @ 10.2A								

① Parallel and phase 6.3V windings for Sec. # 4.

TRANSFORMERS (SWEEP CIRCUITS)

ITEM No.	USE	DUMONT PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	RCA TYPE No.	Halldorson PART No.	Thordarson PART No.
Tz	Horiz. Output Trans.	20008402		HVO-9A①	D-19 *	2257T1 *	FB41J * ①	F1Y-12 *
T3	Vert. Output Trans.	20008482	A-8141	A-3039	A-104X	2287T1	21806	T-26854
		20009481②						
T4	Yoke - Horiz. (19MH)	21011742	DY-11A ④	MDF-73④	Y-22-1④	222D1	DF605④	Y-9 4
	Yoke - Vert. (31MH)	8901331③						
T5	Horiz. Linearity (1-4.3MH) (Tapped)	21011001	WC-8⑤	MWC-5		209R1⑤		
T6	Width (1-9.5MH)	21011011	WC-8⑤	MWC-6	WC-12⑤	211R1⑤		WC-17⑤

① Connect linearity coil between pin 5 of damper tube and L38. Do not use center tap.
Connect .1(C109) from pin 5 of damper tube to terminal #3. Connect .033(C107) from B+ end of linearity coil to terminal #3. Connect cathode of damper tube to terminal #8. Remove 15KΩ resistor (R100) from circuit.
② Alternate vertical output transformer.
③ Alternate yoke.
④ Use original horizontal network, if necessary.
⑤ Drill new mounting hole.
⑥ Connect to cutout blue and red terminals.

*HORIZONTAL OUTPUT TRANSFORMER CONNECTION DATA

Use Original Width Coil Unless Replacement Type Is Listed

ORIGINAL TERMINAL CONNECTIONS	Stancor Replacement Connections	Merit Replacement Connections	Triad Replacement Connections	RCA Replacement Connections	Halldorson Replacement Connections	Thordarson Replacement Connections
9		9	9	9	9	9
8			8	8		8
7			7	7		7
6	NC	NC	NC	NC	NC	NC
4		4	4	4	4	4
3		3	3	3	3	3
1		1	1	1	3	1
Connect Width Coil Across →	1 & 3	1 & 3	1 & 3	1 & 3		1 & 3
Special Notes →	①				①	

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE PRI	IMPEDANCE SEC	DUMONT PART No	Stancor PART No	Merit PART No	Triad PART No	Halldorson PART No	Thordarson PART No.	NOTES
T7	2.8KΩ	3.5Ω	902492-2	A-3849 ①	A-3018 ①	S-4X ①	Z1005	T-26550 ①	① Drill one new mounting hole.

SPEAKER

ITEM No.	RATINGS SIZE	RATINGS FIELD	RATINGS V C IMP	DUMONT PART No	VIKING PART No.	QUAM PART No.	NOTES
SP1A	5"	PM	3.5Ω	18003522	574	5Ai	① Used in some models
B	10	PM	3.5Ω	18003511 ①	10J11	10A31	

COILS (RF-IF)

ITEM No.	USE	DC RES. PRI	DC RES. SEC	DUMONT PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	NOTES
L1	UHF Ant.	0Ω						
	Coupling loop							
L2	UHF Ant. Coupling loop	0Ω						
L3	UHF RF Coupling coil	0Ω						
L4	F11. Choke	0Ω		21011831				
L5	UHF Osc. Tank Coil	0Ω						
L6	UHF Osc. Tank Shunt Coil	0Ω						
L7	UHF Osc. Coil	0ΩCT						
L8	UHF Osc. Coupling	0Ω						
L9	UHF Osc. Doubler coupling	0Ω						
L10	RF Choke	.2Ω		21011821				
L11	UHF IF output coil	.1Ω	0Ω	21011841				
L12A	VHF Ant., RF, mixer grid & osc. coils	0Ω		40014881				Channel 2
B	VHF Ant., RF mixer grid & osc. coils	0Ω		40014882				Channel 3
C	VHF Ant., RF mixer grid & osc. coils	0Ω		40014883				Channel 4
D	VHF Ant., RF, mixer grid & osc. coils	0Ω		40014884				Channel 5
E	VHF Ant., RF mixer grid & osc. coils	0Ω		40014885				Channel 6
F	VHF Ant., RF mixer grid & osc. coils	0Ω		40014886				Channel 7
G	VHF Ant., RF, Mixer grid & osc. coils	0Ω		40014887				Channel 8
H	VHF Ant., RF, mixer grid & osc. coils	0Ω		40014888				Channel 9
I	VHF Ant., RF, mixer grid & osc. coils	0Ω		40014889				Channel 10
J	VHF Ant., RF, mixer grid & osc. coils	0Ω		40014891				Channel 11
K	VHF Ant., RF, mixer grid & osc. coils	0Ω		40014892				Channel 12
L	VHF Ant., RF, mixer grid & osc. coils	0Ω		40014893				Channel 13
M	40MC UHF IF strip	0Ω		40014896				Used in UHF position only with tuner Part # 89012911, Tuner Part # 89012901 has dummy strip in UHF position

(CONT'D ON NEXT PAGE)

PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

PARTS LIST AND DESCRIPTIONS (Continued)

COILS (cont)

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA DUMONT PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	NOTES
L13	Neutr. Coil	0Ω		21010460				
L14	Fil. Choke	0Ω		21012051				
L15	Feedback Coil	0Ω		21012041				
L16	RF Choke	0Ω		21010470				
L17	Conv. Plate	.1Ω	0Ω	21010440				
L18	41.25MC Trap	1.9Ω		21012011	19-1004		4610	7.5 Micohenries
L19	1st Video IF	.1ΩCT		20008741				
L20	47.25MC Trap	0Ω		21012201	20-1047			
L21	Fil. Choke	.1Ω		21008972	19-1002		4606	2.1 Microhenries
L22	2nd Video IF	.3Ω	.3Ω	20008731	17-4524 †		6219	
L23	Fil. Choke	.1Ω		21008972	19-1002		4606	2.1 Microhenries
L24	3rd Video IF	.3Ω	.3Ω	20008731	17-4522		6219	
L25	Fil. Choke	.1Ω		21008972	19-1002		4606	2.1 Microhenries
L26	4th Video IF	.3Ω	.3Ω	20008731	17-4524		6219	
L27	Series Peaking Coil	1.3Ω		21011301	19-1005		4612	10 Microhenries
L28	Series Peaking Coil	1.8Ω		21011082	19-1005		4612	11.5 Microhenries
L29	Shunt Peaking Coil	10Ω		21006628	19-3180	TV-184	6154	197 Microhenries
L30	Series Peak. Coil	7Ω		21006622	19-3100	TV-181	4642	110 Microhenries
L31	Series Peak. Coil	10Ω		21006628	19-3180	TV-184	6154	197 Microhenries
L32	4.5MC Trap	2.1Ω		21010962	20-1004	TV-151	1470	
L33	Shunt Peaking Coil	18Ω		21006629	19-3500	TV-188	6174	500 Microhenries
L34	Sound IF	1.9Ω		21012211	17-3400	TV-151	1469	
L35	Ratio Det.	5.5Ω	.8ΩCT	20008761	17-3497	TV-115	6205	Tertiary winding=.7Ω
L36	RF Choke	.59Ω		21006230	19-3001	TV-189	6175	.82 Microhenries; IRC Part # CLA
L37	Horiz. Osc.	57Ω		21010991	19-1576	TV-163	6210	
L38	RF Choke	2.8Ω		21006520	19-1003		4608	4.7Microhenries; IRC Part # CL-1
L39	RF Choke	1.8Ω		21006280	19-1002		4606	2.2 Microhenries; IRC Part # CLA
L40	RF Choke	1.8Ω		21006280	19-1002		4606	2.2 Microhenries; IRC Part CLA

† Disconnect R29 when used as replacement.

FILTER CHOKE

ITEM No.	RATINGS TOTAL DIRECT CURRENT	RATINGS D. C. RESISTANCE	RATINGS INDUCTANCE (0 CURRENT 1000 ∿)	REPLACEMENT DATA DUMONT PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.
L41	.240ADC	44.6Ω	2HY	21010951	C-2326 ①	C-2991 ①	C-17X	C5037 ①	26C43 ①

① Drill one new mounting hole.

FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA DUMONT PART No. FUSE	DUMONT PART No. HOLDER	LITTELFUSE PART No. FUSE	LITTELFUSE PART No. HOLDER	BUSS PART No. FUSE	BUSS PART No. HOLDER
M1	3AG	1/4A 250V	11090720	11000600	312.250 (3AG-1/4A)	357001	AGC 1/4	4405

CRYSTAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA DUMONT PART No.	SYLVANIA PART No.	FEDERAL PART No.	NOTES
M2	1N82		1N82 or A		UHF Mixer
M3	G7B		1N109		Harmonic generator

MISCELLANEOUS

ITEM No.	PART NAME	DUMONT PART No.	NOTES
M4	Dial Light	12006700	#47 Jewel lamp
M5A	Tuner	89012901	Ch. RA-306 stamped G
B	Tuner	89012911	Ch. RA-307 UHF models stamped G
C	Tuner	89012971	Chassis stamped S
M6	Tuner	89013291	UHF
M7	Trap	88000731	Antenna filter (UHF models only)
M8	Switch	05007371	VHF-UHF changeover
M9	Switch	05005120	TV-phono
M10	Centering Magnet	29000651	
M11	Ion Trap	29001661	
	Knob	45004437	UHF Selector - Mahogany
	Knob	45004438	UHF Selector - Blonde
	Knob	45004441	Fine tuning
	Knob	45004442	Brightness
	Knob	45004451	Volume - Mahogany
	Knob	45004454	Volume - Blonde
	Knob	45004711	Horiz. Hold & Tone
	Knob	45005121	Contrast
	Knob	45005483	VHF Selector - Mahogany
	Knob	45005484	VHF Selector - Blonde
	Safety Glass	45004001	21" Console Model
	Safety Glass	45004004	21" Table Model

TROUBLE SHOOTING AIDS (cont)

POWER

DEAD SET

If filaments fail to light, check AC interlock assembly, switch on volume control and T1. If filaments light, substitute V22 and V23. Check B+ filter and decoupling network components.

SMALL AND/OR DIM PICTURE

Substitute V22 and V23. Check B+ filter and decoupling network components.

HIGH VOLTAGE

LOSS OF HIGH VOLTAGE

Check TV-phono switch position. Check fuse M1. Check by substitution V18, V19, V20 and V21. Check waveform W16.

If Satisfactory	If Unsatisfactory
Check L40, T2, T4A, R118, R121, R122 and other associated circuit components.	Check R114, C104, and other associated circuit components.

INSUFFICIENT HIGH VOLTAGE

Check by substitution V18, V19, V20, V21, V22 and V23. Check picture tube. Proceed as outlined under "Loss of High Voltage".

BLOOMING

Check by substitution V18, V19, V20, V21, V22 and V23. Check T2, T4A, R122, R121, R118, C4, picture tube and other associated components.

GENERAL

RASTER SOUND NO PICTURE

Follow procedure outlined under "Loss of Video".

RASTER PICTURE NO SOUND

Follow procedure outlined under "Weak or No Sound".

RASTER NO SOUND NO PICTURE

Check V2, V3, V4, V5, V6, V7 and V8. by substitution. Check video IF detector, output and tuner circuit components. In case of UHF check V1 and associated components.

NO RASTER NO SOUND

Follow procedure outlined under "Dead Set".

KEYSTONE EFFECT

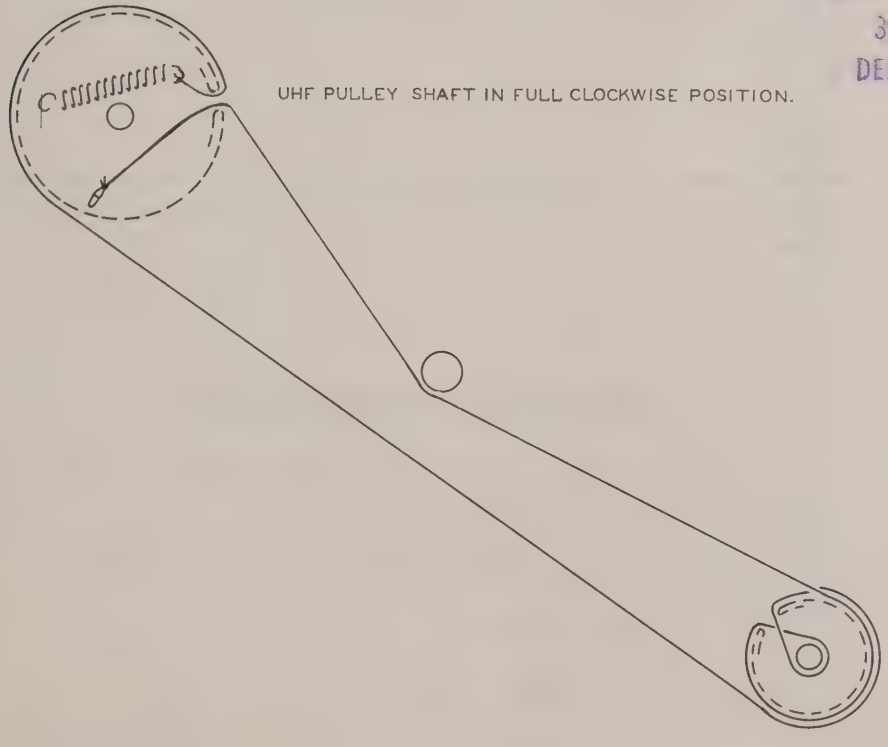
Check T4, C110, R98, R99 and R100.

INTERMITTENT STREAKS

Check high voltage section for corona discharge and arcing.

Symptoms shown are assumed and are not indicative of the quality and workmanship of this equipment.

PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO



UHF DRIVE CORD STRINGING

SERVICING IN THE FIELD

TUNER OSCILLATOR ADJUSTMNETS

Touch-up adjustments of the VHF Tuner Oscillator Circuit may be accomplished by removal of the Channel Selector and Fine Tuning knobs. The adjustments are accessible, one at a time, through the small hole in the cabinet to the right of the Channel Selector shaft.

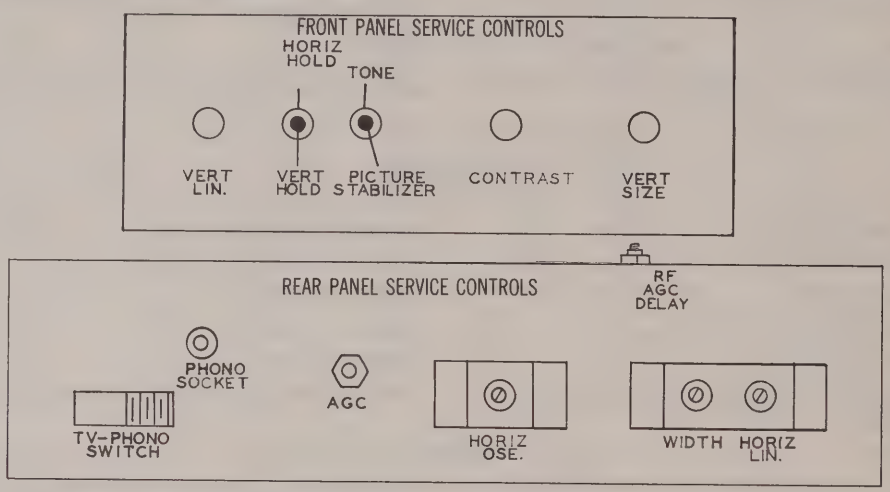
PICTURE TUBE SAFETY GLASS CLEANING

To clean safety glass remove 3 wood screws holding wood strip at top of safety glass. Remove wood strip and safety glass. Use extreme caution when removing safety glass.

PICTURE TUBE REMOVAL

For picture tube removal it is necessary to remove chassis. (See disassembly instructions).

SERVICE ADJUSTMENT LOCATION



HORIZONTAL OSCILLATOR FIELD ADJUSTMENT

Adjustment of the Horiz. Oscillator Circuit can be made from the rear panel of the chassis. Set the Horiz. Hold Control at the Mid-position of its range and adjust the Horiz. Osc. slug until the picture synchronizes horizontally.

SOUND IF DETECTOR BUZZ ADJUSTMENT

To eliminate Sound IF Detector Buzz, adjust the Ratio Detector Secondary L35 located on top of chassis. (See tube placement chart).

FUSES

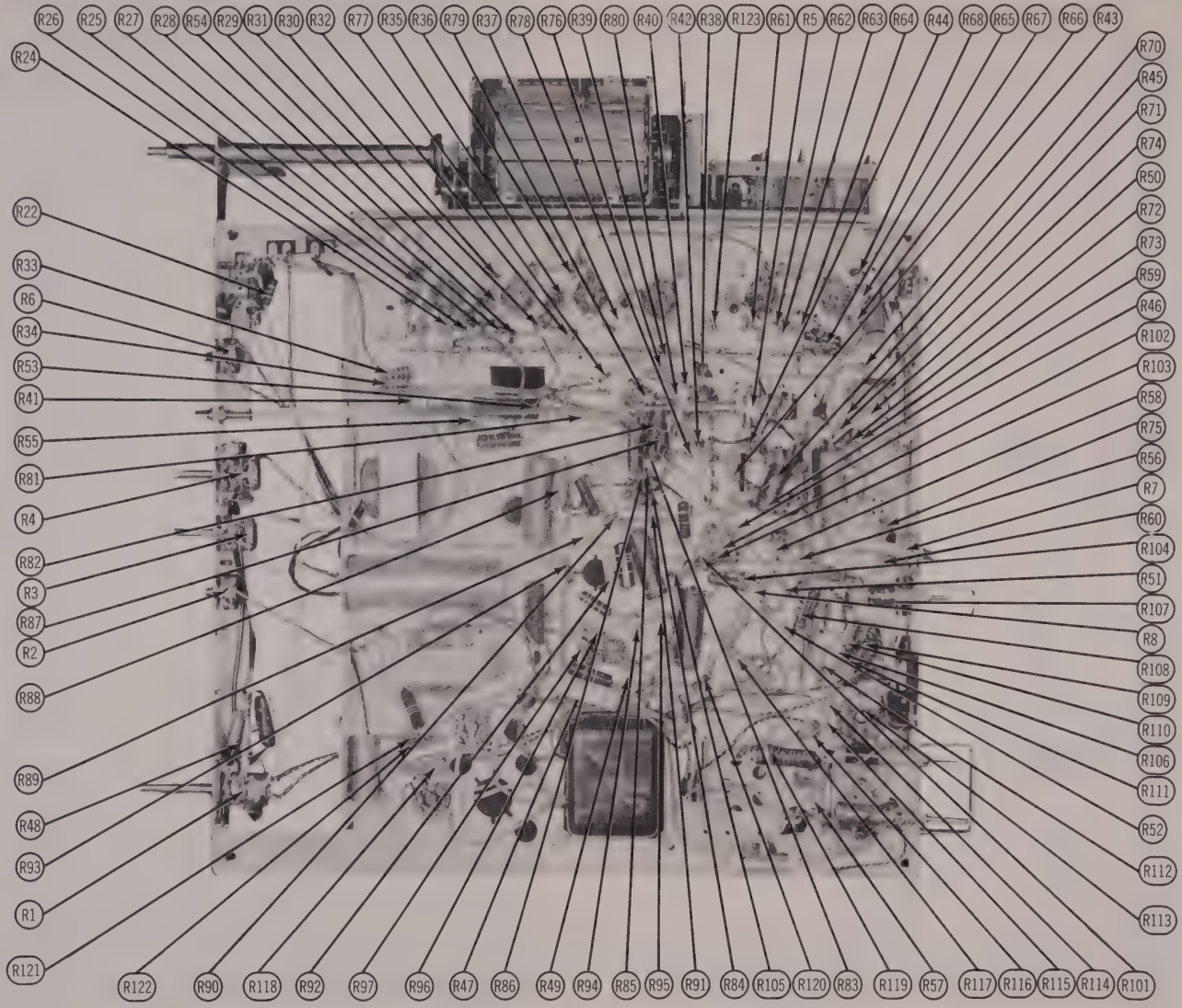
One fuse is used for Horiz. Sweep Circuit protection. (For location, see tube placement chart).

CENTERING

Centering is accomplished mechanically by adjusting two magnetic rings around the neck of the picture tube, located flush against the deflection yoke. Rotate the two rings around the neck of the tube until the picture is properly centered.

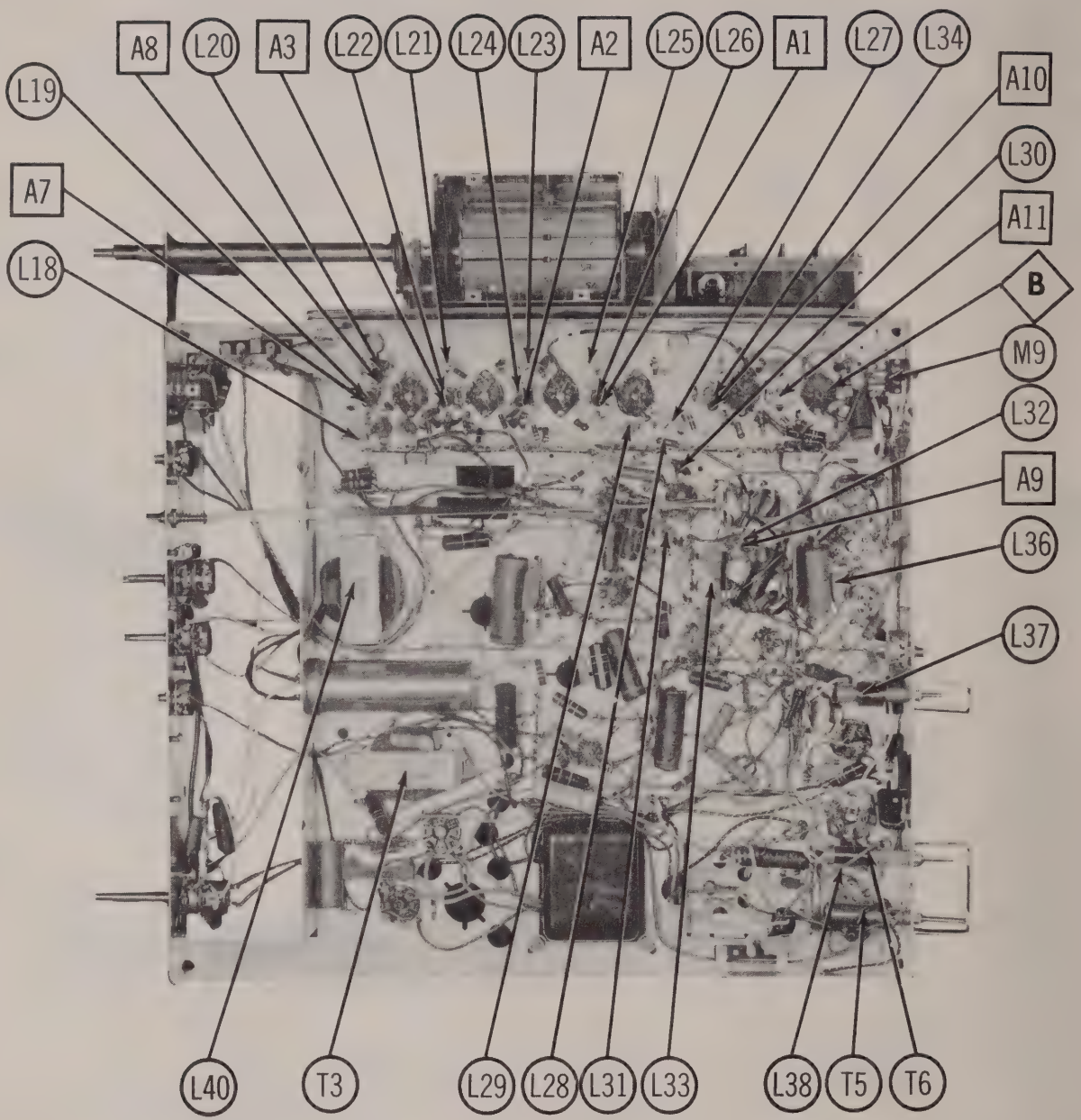
DISASSEMBLY INSTRUCTIONS

1. Remove 8 push on type control knobs from front panel.
2. Remove 4 wood screws. Remove rear cover.
3. Disconnect built-in antenna yoke plug, speaker plug, CRT socket, H. V. lead and ground strap from chassis. to picture tube strap.
4. Remove 2 wood screws. Remove transmission lines.
5. Remove 4 chassis bolts. Remove chassis.
6. Remove 4 speaker nuts. Remove speaker.



CHASSIS BOTTOM VIEW-RESISTOR IDENTIFICATION

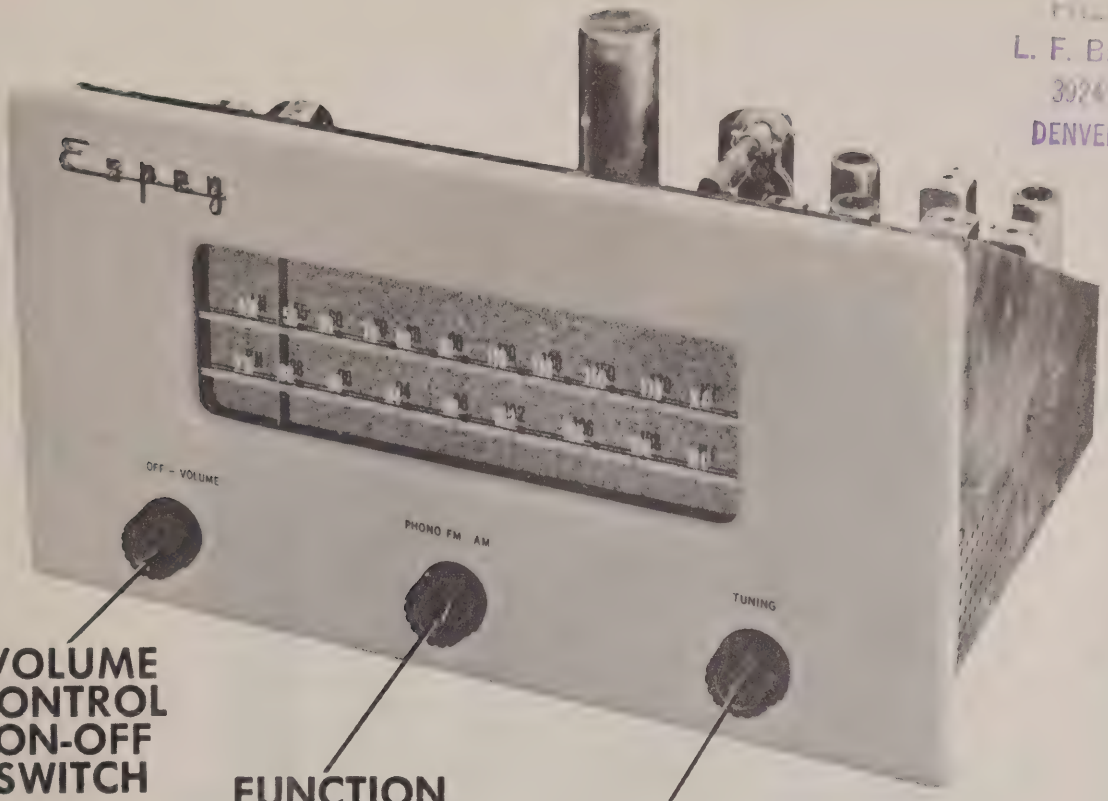
PROPERTY OF
L. F. BLANKEN
DENVER, COLORADO



CHASSIS BOTTOM VIEW-TRANS., INDUCTOR AND ALIGNMENT IDENTIFICATION

L. F. BLANKENSHIP
3924 MEADE ST
DENVER, COLORADO

ESPEY
MODEL 101



ESPEY
MODEL 101

TRADE NAME	Espey Model 101
MANUFACTURER	Espey Mfg. Co., Inc., 528 E. 72nd. St., New York 21, N.Y.
TYPE SET	AC Operated AM-FM Superheterodyne Tuner For Custom Installations
TUBES (Eight)	Types 6BA6 FM RF Amp., 12AT7 FM Conv., 6BE6 AM Conv., 6BA6 AM-FM IF Amp., 6AU6 2nd. FM IF Amp., 6AL5 Ratio Det., 6AT6 AM Det.-AF Amp., 5Y3GT Rectifier
POWER SUPPLY	110-120 Volts AC — RATING .53 Amp. @ 117 Volts AC
TUNING RANGE - BROADCAST	535-1700KC — FREQ. MOD. 88-108MC

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

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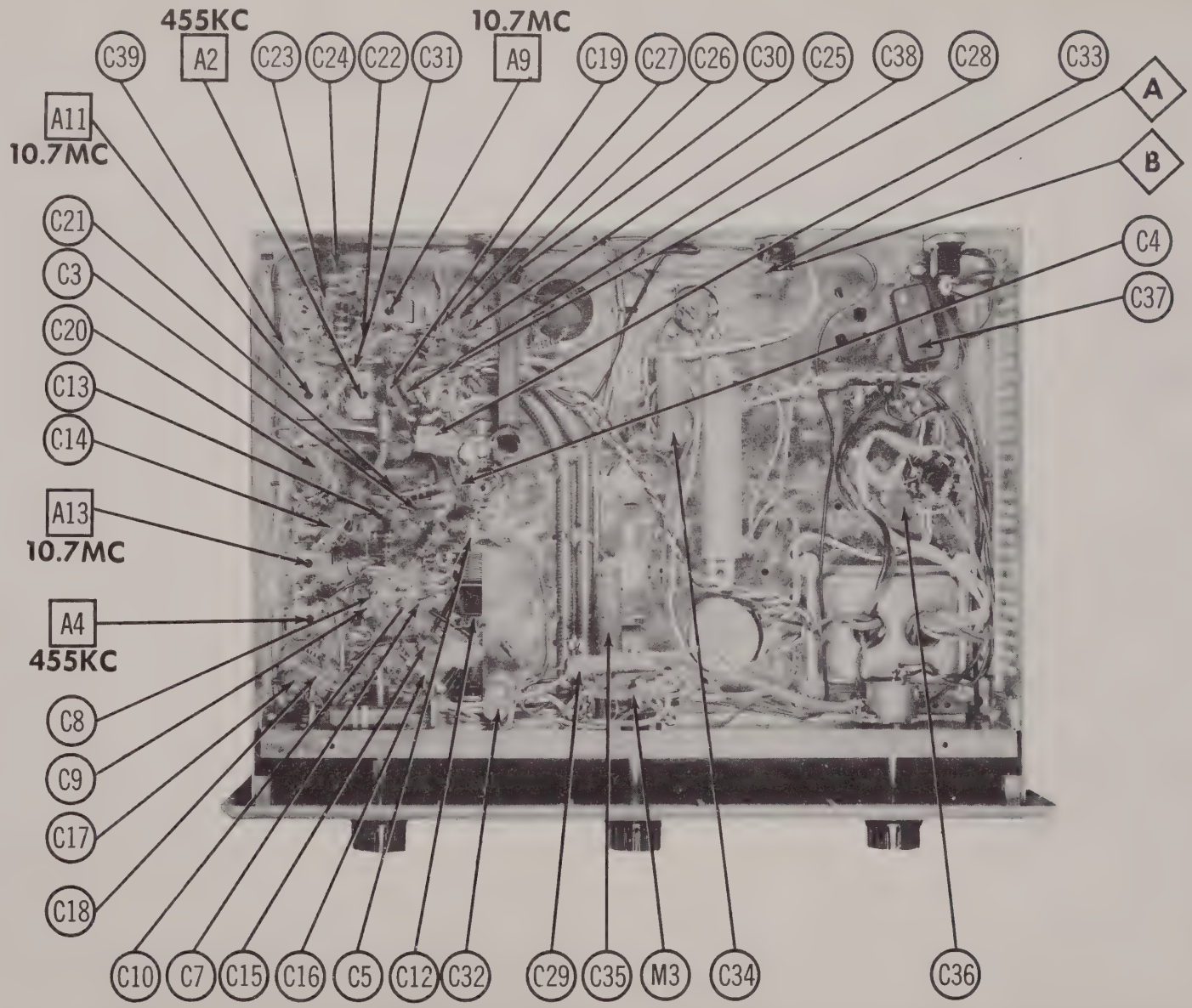
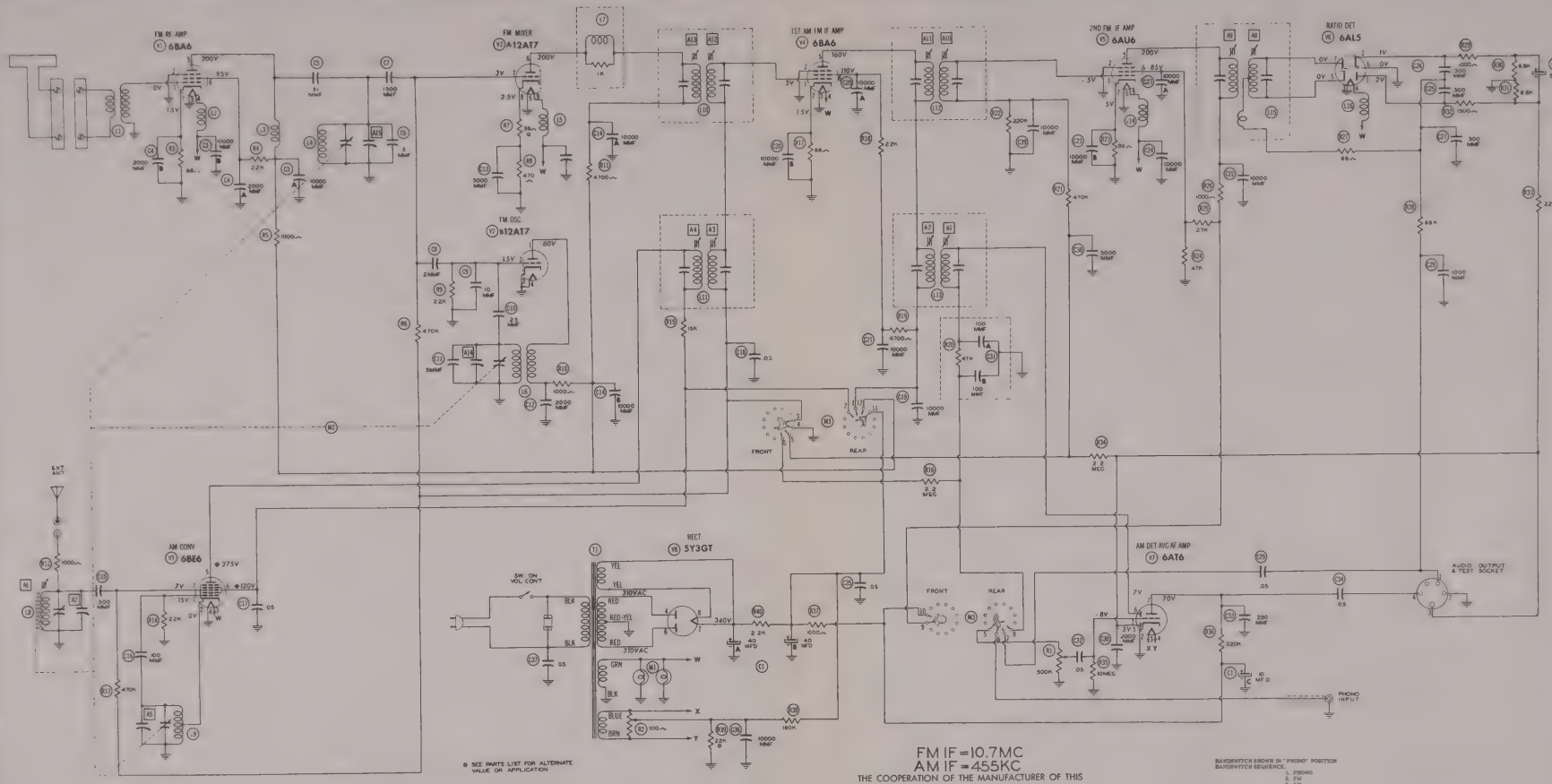


CHASSIS BOTTOM VIEW-CAPACITOR IDENTIFICATION



RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6BA6	0Ω	0Ω	0Ω	.2Ω	↑ 3.2KΩ	↑ 25KΩ	68Ω		
V 2	12AT7	↑ 3.2KΩ	22KΩ	0Ω	0Ω	0Ω	↑ 7KΩ	1.2 Meg	510Ω	.2Ω
V 3	6BE6	22KΩ	0Ω	.2Ω	0Ω	↑ ∞2.2KΩ	↑ ∞ 17KΩ	∞ 3.3Meg		
V 4	6BA6	600KΩ	0Ω	0Ω	.2Ω	↑ 7KΩ	↑ 24KΩ	68Ω		
V 5	6AU6	250KΩ	0Ω	0Ω	.2Ω	↑ 4.2KΩ	↑ 30KΩ	68Ω		
V 6	6AL5	7.8KΩ	8.3KΩ	0Ω	.2Ω	INF	0Ω	INF		
V 7	6AT6	10 Meg	0Ω	22KΩ	22KΩ	230KΩ	∞ 550KΩ	↑ 225KΩ		
V 8	5Y3GT	0Ω	200KΩ	↑ 3.2KΩ	100Ω	INF	100Ω	22KΩ	200KΩ	

ALL MEASUREMENTS IN FM POSITION UNLESS OTHERWISE DESIGNATED.
∞ MEASURED IN AM POSITION.
↑ MEASURED FROM PIN 8 OF V8

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

A PHOTOFACT STANDARD NOTATION SCHEMATIC
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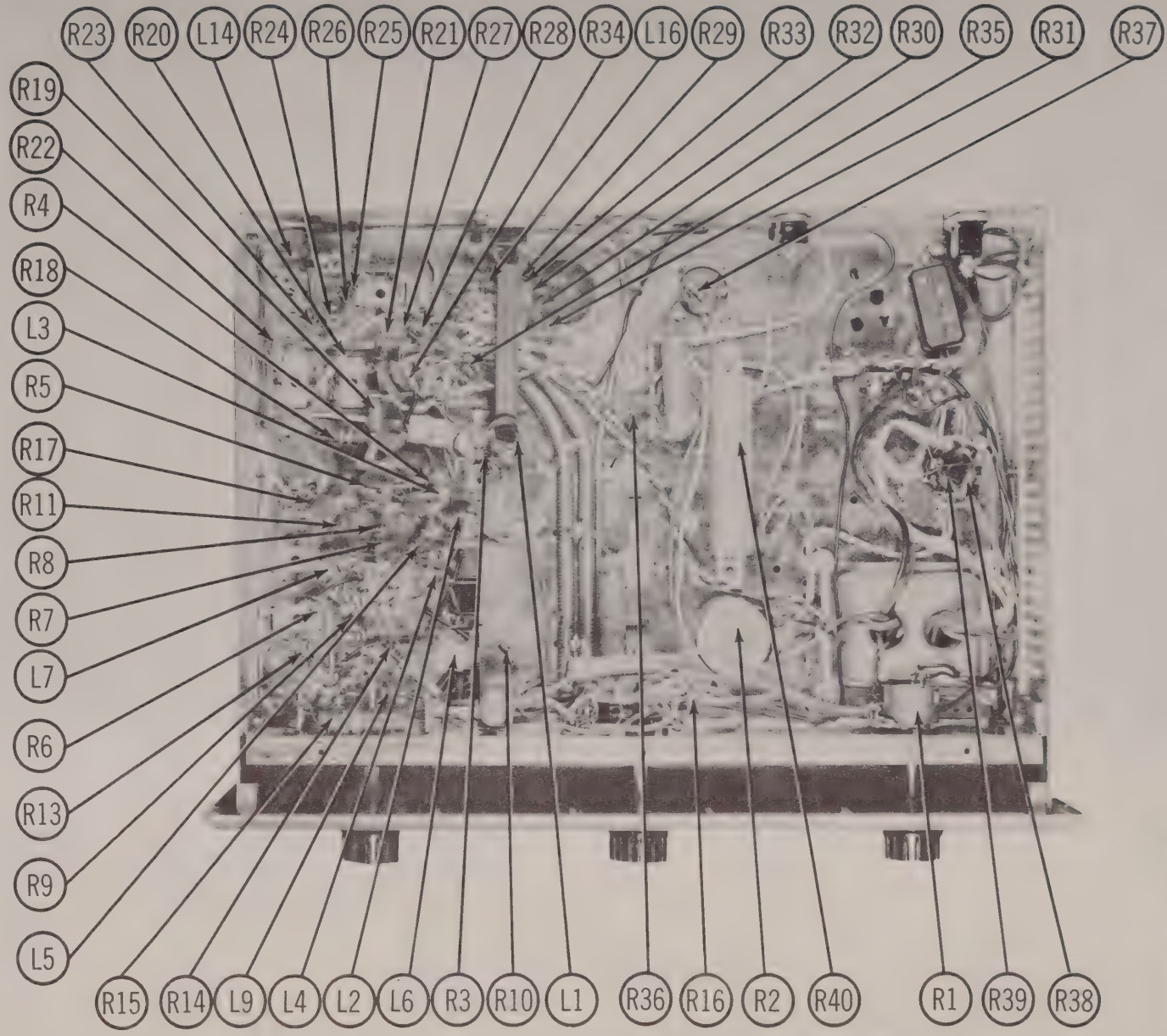


CHASSIS BOTTOM VIEW-RESISTOR IDENTIFICATION

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.
With tuning gang fully closed set dial pointer to index mark just to the left of "55" on the dial.

AM ALIGNMENT

Attenuate generator output to maintain 0.5 watt output meter indication. 0.5 watt is approximately 1.4 volts deflection across the 4Ω voice coil and 2 volts across the 8Ω voice coil.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.01MFD	High side to pin 1 (grid) of 6BA6 (V4). Low side to chassis.	455KC (400∿Mod)	AM	Tuning gang fully open	Across voice coil	A1, A2	Adjust for maximum output.
2.	"	High side to pin 7 (grid) of 6BE6 (V3). Low side to chassis.	"	"	"	"	A3, A4	"
3.	5MMF	High side thru 5MMF to AM antenna socket. Low side to chassis.	1700KC	"	1700KC	"	A5	"
4.	"	"	600KC	"	600KC	"	A6	"
5.	"	"	1550KC	"	1550KC (small index mark just to right of 1500 on dial)	"	A7	Adjust for maximum output. Repeat steps 4 and 5.

FM IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
6.	.01MFD	High side to pin 1 (grid) of 6AU6 (V5). Low side to chassis.	10.7MC (No Mod.)	FM	Point of non-interference	DC probe to point Ⓐ. Common to chassis.	A8	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.
7.	"	"	"	"	"	DC probe to point Ⓑ. Common to chassis.	A9	Adjust for maximum deflection. Repeat steps 6 and 7.
8.	"	High side to pin 1 (grid) of 6BA6 (V4). Low side to chassis.	"	"	"	"	A10, A11	Adjust for maximum deflection. Attenuate signal generator to maintain 1.5 volts at VTVM.
9.	"	High side to pin 7 (grid) of 12AT7 (V2). Low side to chassis.	"	"	"	"	A12, A13	"

FM IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use frequency modulated signal with 60∿ modulation and 450KC sweep. Use 120∿ sawtooth voltage in scope for horizontal deflection.
Use only enough generator output to provide useable pattern on scope.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT SCOPE	ADJUST	REMARKS
6.	.01MFD	High side to pin 1 (grid) of 6BA6 (V4). Low side to chassis.	10.7MC (450KC Swp)	FM	Point of non-interference	Vert. Amp. to point Ⓑ. Low side to chassis.	A9, A10 A11	Disconnect stabilizing capacitor C2. Adjust for curve of maximum amplitude and symmetry similar to Fig. 1.
7.	"	High side to pin 7 (grid) of 12AT7 (V2). Low side to chassis.	" "	"	"	"	A12, A13	"
8.	"	"	"	"	"	Vert. Amp. to point Ⓐ. Low side to chassis.	A8	Reconnect stabilizing capacitor C2. Adjust so that 10.7MC occurs at center of cross-over lines as in Fig. 2. SLIGHTLY retouch A9 for maximum amplitude and straightness of crossover lines. Continue with step 10.

FM RF ALIGNMENT

Attenuate signal generator to maintain ~1.5 volts on VTVM.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
10.	Two 150Ω Carbon Resistors	Across FM antenna socket terminals with 150Ω in each lead.	108MC (Unmod)	FM	108MC	DC probe to point Ⓑ. Common to chassis.	A14	Adjust for maximum deflection. Attenuate signal generator to maintain 1.5 volts at VTVM.
11.	"	"	106MC	"	106MC	"	A15	"
12.	"	"	90MC	"	90MC	"		Check L4 with a tuning wand. If necessary, compress or expand coil for maximum deflection. Repeat steps 11 and 12 until proper RF tracking is obtained.

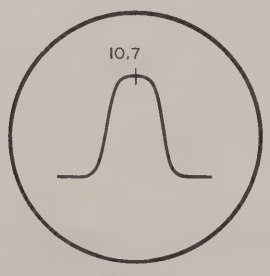


FIG. 1

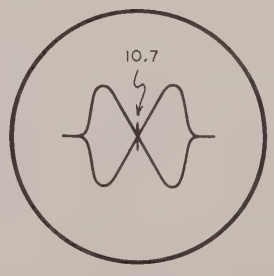


FIG. 2

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA		RETMA BASE TYPE	NOTES
		ESPEY PART No.	STANDARD REPLACEMENT		
V1	FM RF Amplifier	6BA6	6BA6	7BK	
V2	FM Mixer & Osc.	12AT7	12AT7	9A	
V3	AM Converter	6BE6	6BE6	7CH	
V4	1st. AM FM IF Amp.	6BA6	6BA6	7BK	
V5	2nd. FM IF Amp.	6AU6	6AU6	7BK	
V6	Ratio Detector	6AL5	6AL5	6BT	
V7	AM Det.-AF Amp.	6AT6	6AT6	7BT	
V8	Rectifier	5Y3GT	5Y3GT	5T	

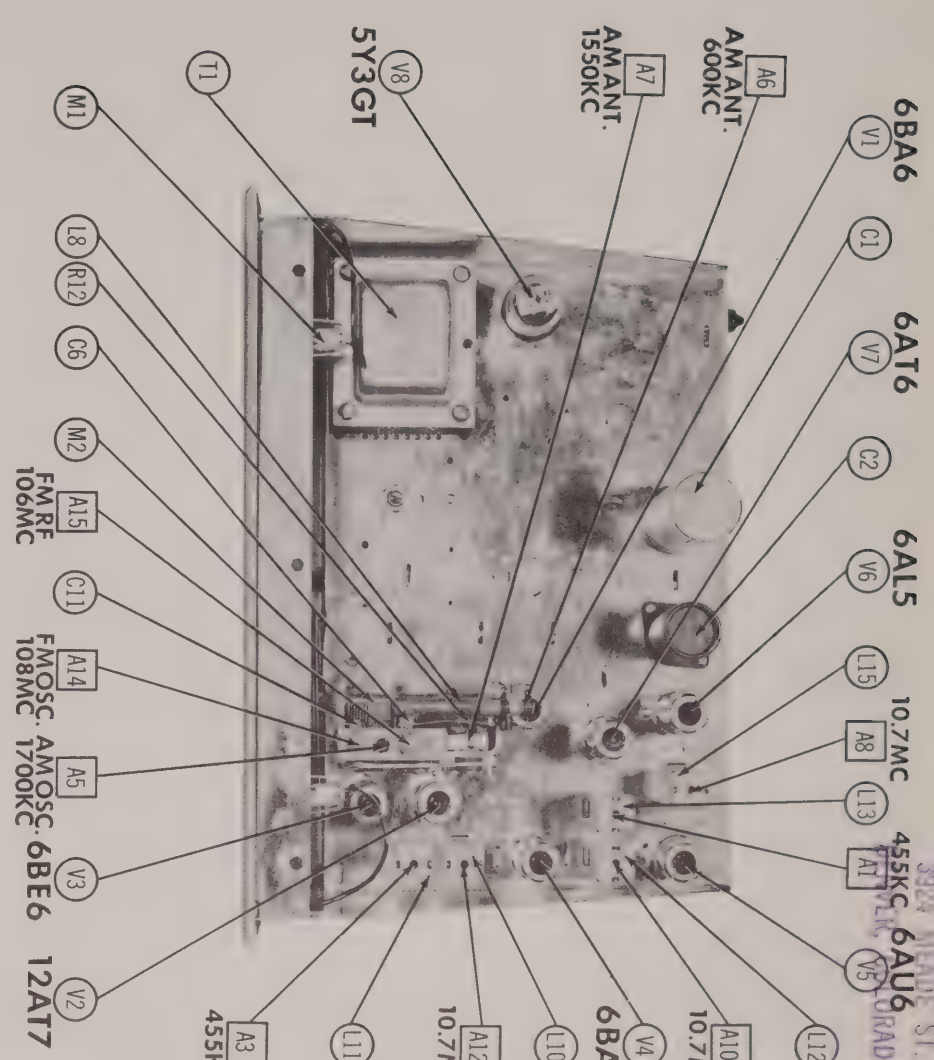
CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	ESPEY PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C1A	▲40	450		AFH3-43		C034		FP376.8	TVL-3785	
B	■40	450								
C	▲10	450								
C2	5	250		PRS250/4		BR425		TC50X	TVA-1501	
C3A	10000			BPD-2X01	DD3-103	DK082	811-01	DC-511	5HK-2S1	
B	10000						811-01	DC-511		
C4A	2000			BPD-2X002	DD2-202	DK072	812-002	DCD-522	5HK-2D2	
B	2000									
C5	51									
C6	5			SI5NP0	TCZ-4.7	TZ07	NP0K-050	ZT-555	5TCCB-V47	
C7	1500			SI1500	D6-152	TP54	GP2L-152	UC-5215	5HK-D15	
C8	2									
C9	10			SI10NP0	TCZ-10	TZ09	NP0K-100	ZT-541	5TCC-Q1	
C10	25			SI25NP0	TCZ-25	TZ15	NP0K-250	ZT-5425	5TCC-Q25	
C11	5			SI5NP0	TCZ-4.7	TZ07	NP0K-050	ZT-555	5TCCB-V47	
C12	2000			SI2000	D6-202	TP56	GP2-333-202	UC-522	5HK-D2	
C13	5000			BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C14A	10000			BPD-2X01	DD3-103	DK082	811-01	DC-511	5HK-2S1	
B	10000						811-01	DC-511		
C15	500			SI500	D6-501	TP47	GP2K-501	UC-535	5GA-T5	
C16	100			SI100NP0	TCZ-100	TZ30	NP0-333-101	ZT-531	5TCC-T1	
C17	.05	400		P488-05	DF-503	CUB4S5		PT415	4TM-S5	
C18	.05	200		P288-05	DF-503	CUB2S5		PT415	2TM-S5	
C19	10000			BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C20A	10000			BPD-2X01	DD3-103	DK082	811-01	DC-511	5HK-2S1	
B	10000						811-01	DC-511		
C21	10000			BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C22	10000			BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C23A	10000			BPD-2X01	DD3-103	DK082	811-01	DC-511	5HK-2S1	
B	10000						811-01	DC-511		
C24	10000			BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C25	300			SI300	D6-301	TP42	GP2K-301	UC-533	5GA-T3	
C26	300			SI300	D6-301	TP42	GP2K-301	UC-533	5GA-T3	
C27	300			SI300	D6-301	TP42	GP2K-301	UC-533	5GA-T3	
C28	1000			BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C29	.05	200		P288-05	DF-503	CUB2S5		PT415	2TM-S5	
C30	2000			SI2000	D6-202	TP56	GP2-333-202	UC-522	5HK-D2	
C31A	100			♦PA-97-1	♦PC-50	♦111TM1	♦1403-01	UC-531	♦100C1	
B	100							UC-531		
C32	.05	200		P288-05	DF-503	CUB2S5		PT415	2TM-S5	
C33	250	500		1468-00025	D6-251	5W5T25	GP2K-251	MC240	1FM-325	
C34	.05	400		P488-05	DF-503	CUB4S5		PT415	4TM-S5	
C35	.05	400		P488-05	DF-503	CUB4S5		PT415	4TM-S5	
C36	10000			BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C37	.05	400		P488-05	DF-503	CUB4S5		PT415	4TM-S5	
C38	5000			BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C39	10000			BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	

♦ Items C31A, C31B, R20 are combined in one unit.

CHASSIS—TOP VIEW



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PARTS LIST AND DESCRIPTIONS (Continued)

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESIST-ANCE	WATTS	ESPEY PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	
R1A	500KΩ	½	A9. 315-A	Q13-133	AG-60-Z	B-60-S	U-48	Volume
B	Shaft		Not Req.	Not Req.	FS-3	Not Req.	Not Req.	Attach to R1
C	Switch		Not Req.	76-1	SWB	Not Req.	US-26	Attach to R1
R2A	100Ω	2	A9. 310-A	W-100	A43-100	VK-121	R100L	Hum balance-wire wound
B	Shaft		Not Req.	Not Req.	FKS-1/4	Not Req.	Not Req.	Attach to R2A

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	ESPEY PART No.	IRC PART No.	
R3	68Ω	½		BTS-68	
R4	22KΩ	1		BTA-22K	
R5	1000Ω	½		BTS-1000	
R6	470KΩ	½		BTS-470K	
R7	39Ω	½		BTS-39	Note 2
R8	470Ω	½		BTS-470	
R9	22KΩ	½		BTS-22K	
R10	1000Ω	½		BTS-1000	
R11	4700Ω	½		BTS-4700	
R12	1000Ω	½		BTS-1000	
R13	470KΩ	½		BTS-470K	
R14	22KΩ	½		BTS-22K	
R15	15KΩ	2		BTB-15K	
R16	2.2Meg	½		BTS-2.2Meg	
R17	68Ω	½		BTS-68	
R18	22KΩ	1		BTA-22K	
R19	4700Ω	½		BTA-4700	
R20	47KΩ	½	♦	BTS-47K	
R21	470KΩ	½		BTS-470K	

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	ESPEY PART No.	IRC PART No.	
R22	220KΩ	½		BTS-220K	
R23	68Ω	½		BTS-68	
R24	47KΩ	1		BTA-47K	
R25	27KΩ	½		BTS-27K	
R26	1000Ω	½		BTS-1000	
R27	68Ω	½		BTS-68	
R28	68KΩ	½		BTS-68K	
R29	1000Ω	½		BTS-1000	
R30	6800Ω	½		BTS-6800	
R31	6800Ω	½		BTS-6800	
R32	1500Ω	½		BTS-1500	
R33	220KΩ	½		BTS-220K	
R34	2.2Meg	½		BTS-2.2Meg	
R35	10Meg	½		BTS-10Meg	
R36	220KΩ	½		BTS-220K	
R37	1000Ω	½		BTS-1000	
R38	180KΩ	½		BTS-180K	Note 1
R39	22KΩ	½		BTS-22K	
R40	2200Ω	15	14.294		

♦ Items R20, C31A, C31B are combined in one unit.
Note 1. Some Models may use a 150KΩ resistor in this application.
Note 2. Some Models may use a 43Ω resistor in this application.

TRANSFORMER (POWER)

ITEM No.	RATING				REPLACEMENT DATA					
	PRI.	SEC. 1	SEC. 2	SEC. 3	ESPEY PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.
T1	117VAC @ .53A	600VCT .079ADC	5VAC 2A	6.3VAC @ .59A	B18 .127 B18.125 ①					T-25R15
				SEC. 4						
				6.3VAC @ 2.4A						

① Alternate power transformer.

COILS (RF-IF)

ITEM No.	USE	DC RES.		REPLACEMENT DATA				NOTES
		PRI.	SEC.	ESPEY PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L1	FM Ant. Coil	0Ω	0Ω	A2. 241				
L2	Fil. Choke	.3Ω		2. 702	19-1001	TV-189	4604	1. 5 Microhenries; IRC Part # CLA
L3	FM RF Choke	1Ω		B2. 402	19-1002		4606	3 Microhenries
L4	FM RF Coil	0Ω		A2. 736				
L5	Fil. Choke	.3Ω		2. 702	19-1001	TV-189	4604	1. 5 Microhenries; IRC Part # CLA
L6	FM Osc. Coil	0Ω	0Ω	B2. 735				
L7	Parasitic Suppressor	0Ω		A2. 279				Wound on 1KΩ resistor

PARTS LIST AND DESCRIPTIONS (Continued)

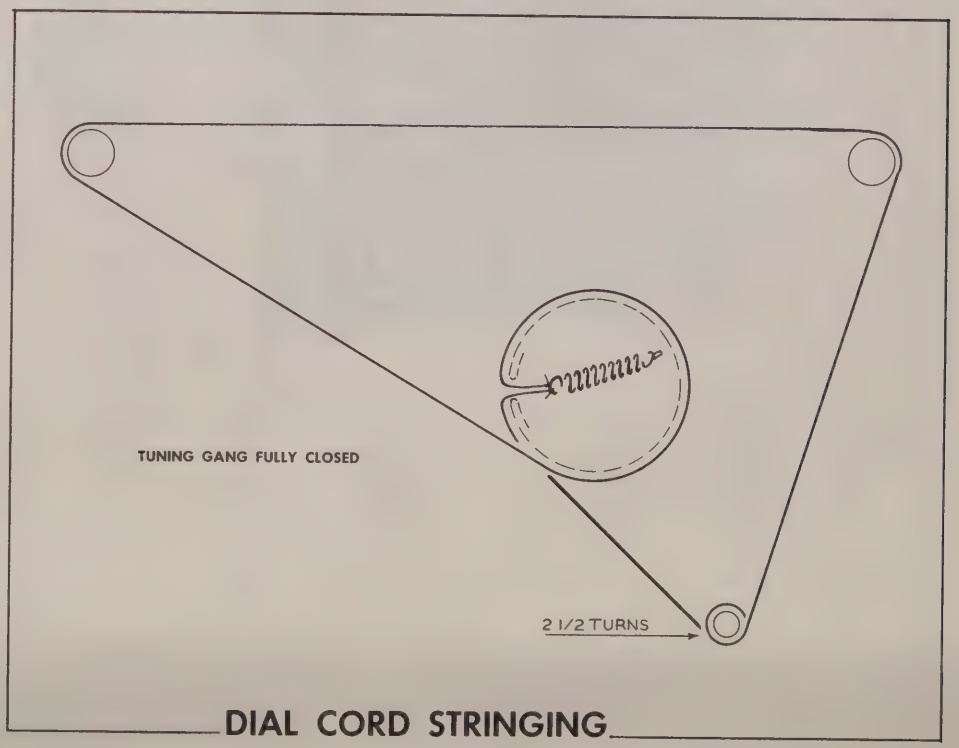
COILS (cont)

ITEM No.	USE	DC RES.		REPLACEMENT DATA				NOTES
		PRI.	SEC.	ESPEY PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L8	AM Ant. Coil	1.2Ω		2. 699			6300	
L9	AM Osc. Coil	6.5Ω		A2. 698			71-Osc. *	Tapped @ .8Ω
L10	1st FM IF	.6Ω	.6Ω	2. 415	16-3487	FM-254	1463	
L11	1st AM IF	9.5Ω	9.5Ω	2. 275	16-6758	BC-352	12-C1	
L12	2nd FM IF	.6Ω	.6Ω	2. 415	16-3487	FM-254	1463	
L13	2nd AM IF	9.5Ω	9.5Ω	2. 275	16-6758	BC-353	12-C2	
L14	Fil. Choke	.3Ω		2. 702	19-1001	TV-189	4604	1. 5 Microhenries; IRC Part # CLA
L15	Ratio Det.	1.4Ω	.9ΩCT	2. 474	17-3488 ♦	FM-255	1465	Tertiary winding=.4Ω
L16	Fil. Choke	.3Ω		2. 702	19-1001	TV-189	4604	1. 5 Microhenries; IRC Part # CLA

* Drill mounting hole.
♦ Cut out chassis hole and drill mounting holes.

MISCELLANEOUS

ITEM No.	PART NAME	ESPEY PART No.	NOTES
M1	Dial light		# 47 bayonet (2 used)
M2	Tuning cap	L6. 116	4 section-AM (24-477MMF, 21-140MMF)
M3	Switch	B12. 298	Function



DIAL CORD STRINGING

PHOTOFACT* Folder

RETMA MEMBER

FIRESTONE
MODEL 13-G-155

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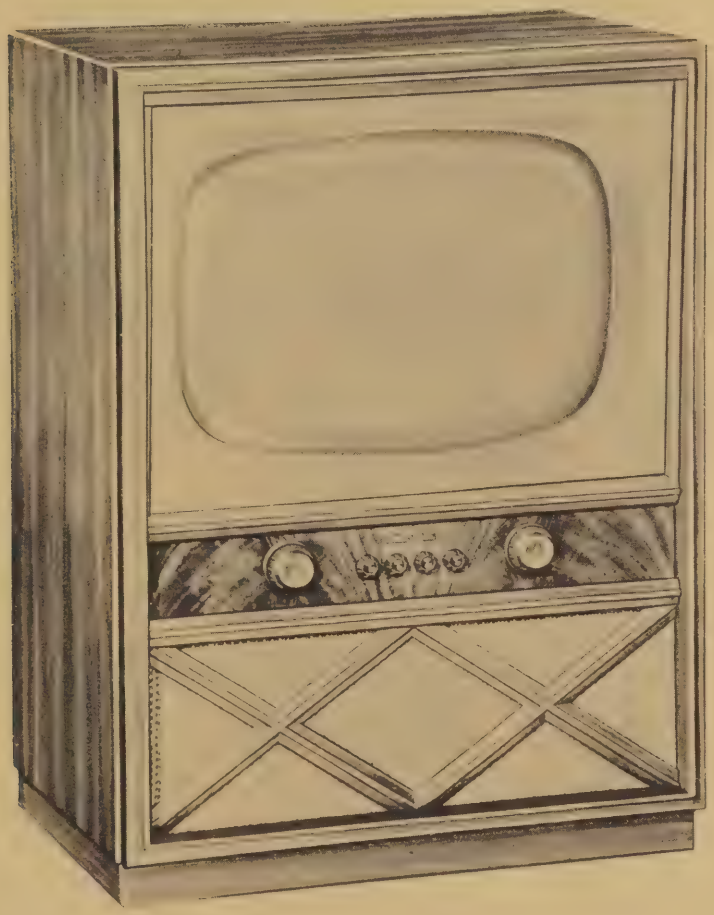

MODEL 13-G-153

FIRESTONE
MODEL 13-G-155

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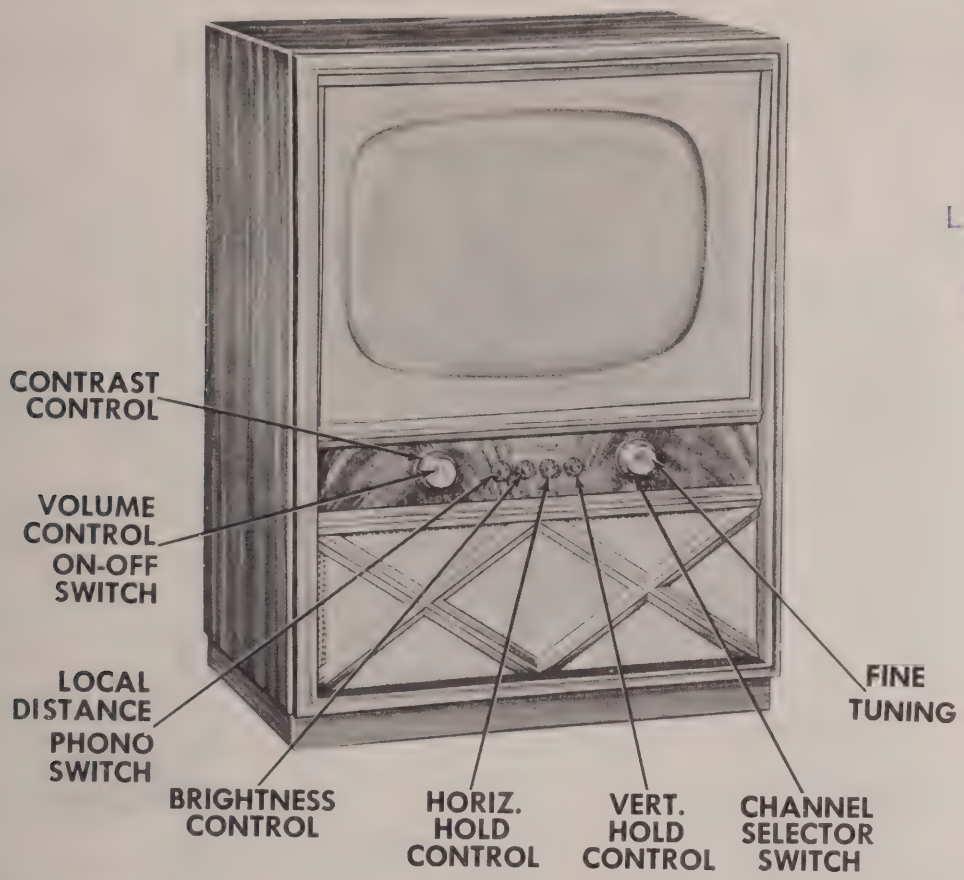
MODEL 13-G-155



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FIRESTONE
MODEL 13-G-155

TRADE NAME	Firestone Model 13-G-155 (Code 155-3-10272)
SUPPLIER	Firestone Tire & Rubber Co., 1200 Firestone Parkway, Akron, Ohio
TYPE SET	Television Receiver
TUBES	Twenty-six

POWER SUPPLY 110-120 Volts AC-60 Cycles RATING 2.36 Amp. @ 117 Volts AC
TUNING RANGE- Channels 2 thru 13, Video IF 25.75MC, Sound IF 21.25MC (Intercarrier)

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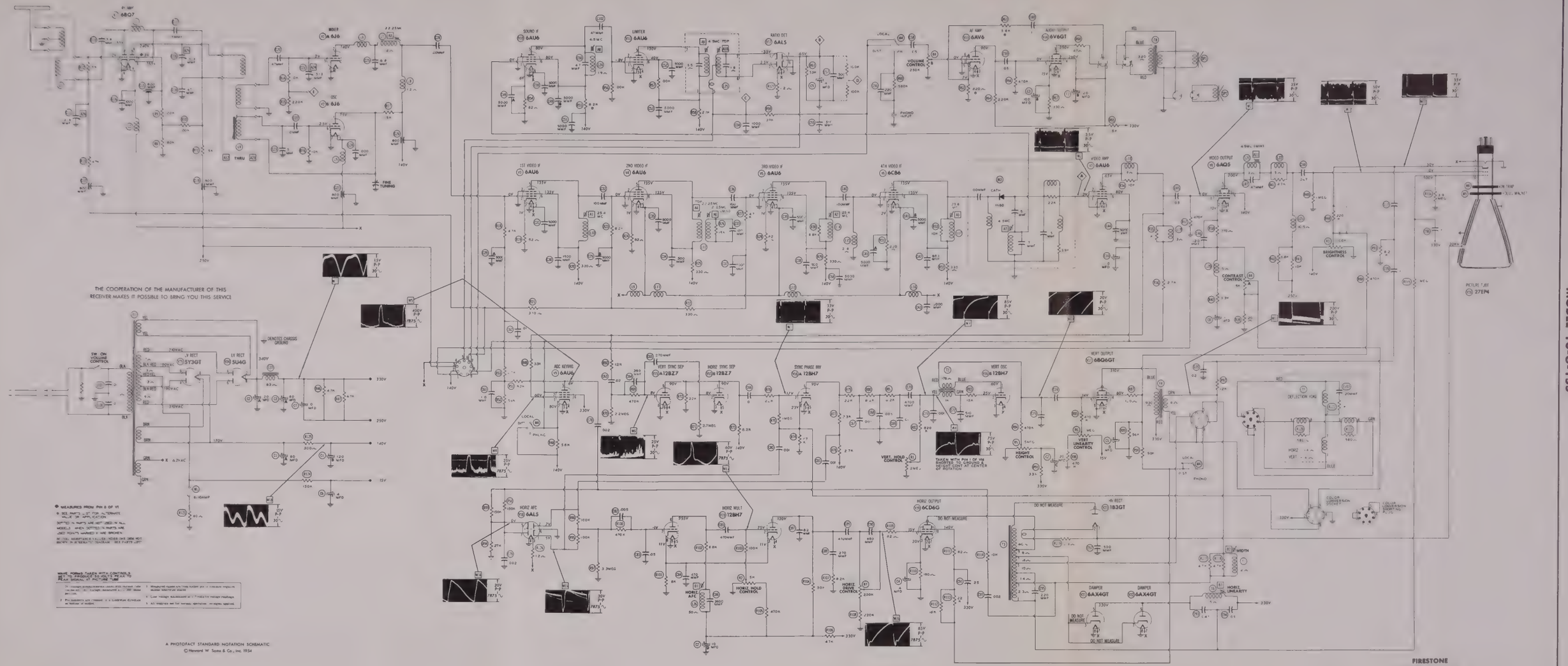
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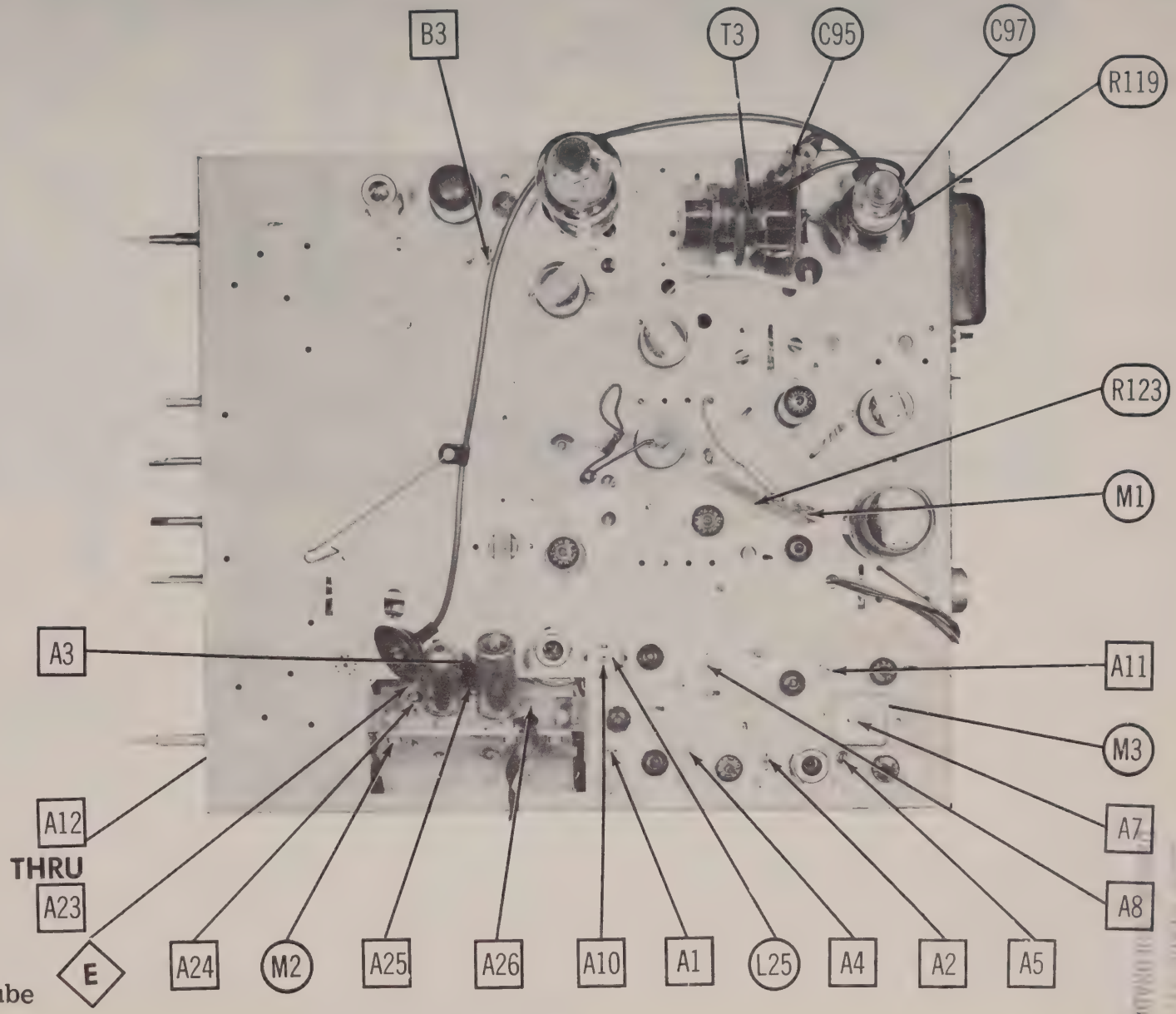
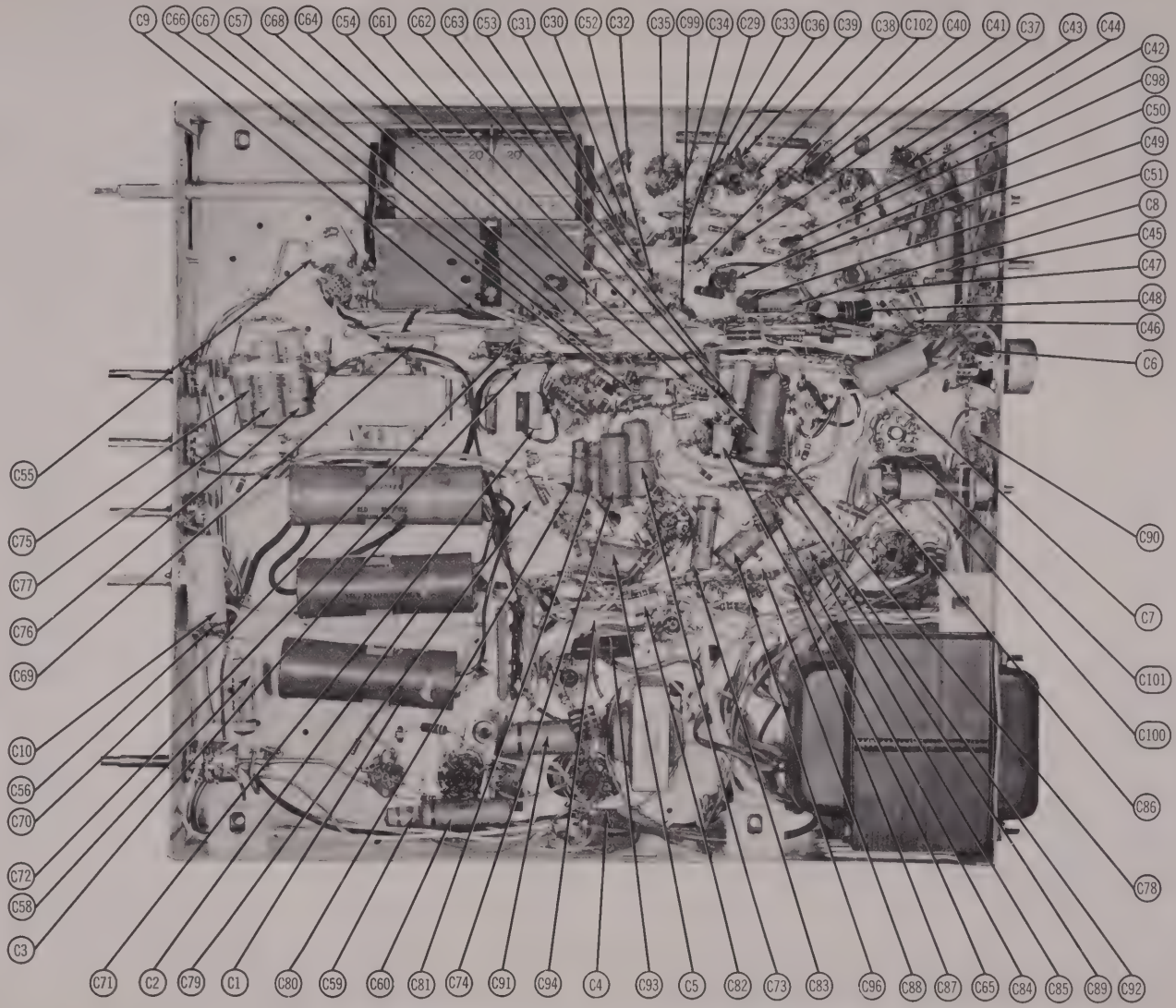


CHASSIS TOP VIEW

For tube location see tube placement chart page 5



CHASSIS BOTTOM VIEW-CAPACITOR IDENTIFICATION

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TUBE PLACEMENT CHART

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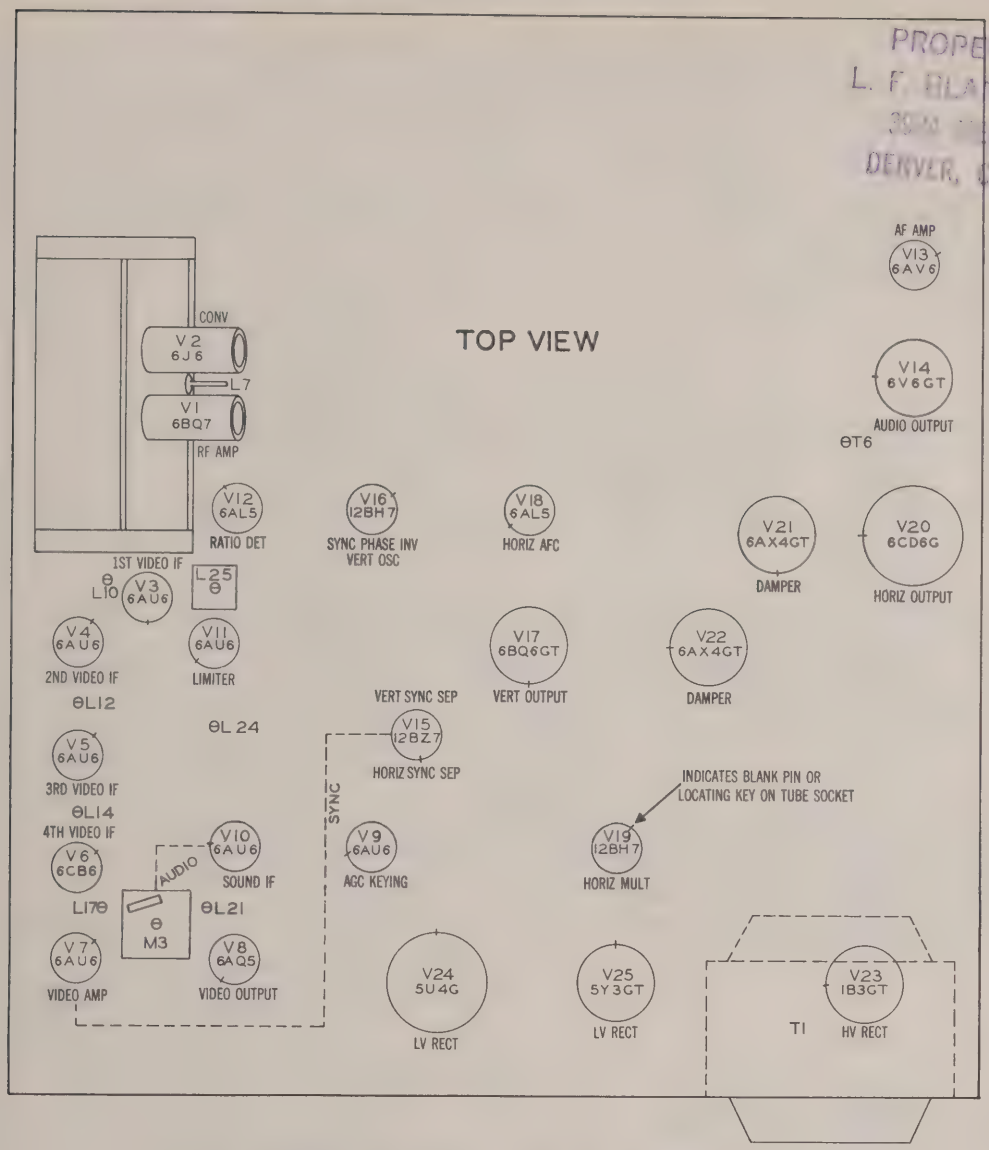

TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce the indicated symptoms. Refer to tube placement chart for location and type of tube.

POWER SUPPLY FAILURE
No raster, no sound - **V24, V25, Fuse (M1)**

LOSS OF PICTURE OR SOUND
No pic, no sound, has raster - **V2, V3, V4, V5, V6**
No pic, no sound, has snow - **V1, V2, V3**
No pic, has sound, has raster - **V7, V8, V26**
Has pic, no sound - **V10, V11, V12, V13, V14**
Overloaded picture - **V9**

SYNC FAILURE
No vert. sync - **V16**
No horiz. sync - **V16, V18, V19**
No vert. or horiz. sync - **V15, V16**

SWEEP FAILURE
No raster, has sound - **V19, V20, V21, V22, V23, V26**
No vertical deflection - **V16, V17**
Poor vert. linearity or foldover - **V16, V17**
Poor horiz. linearity or foldover - **V19, V20, V21, V22**
Narrow picture - **V19, V20, V21, V22, V23, V24, V25**
Vert. off freq. - **V16**
Horiz. off freq. - **V16, V18, V19**

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

The high voltage shock hazard may be eliminated by removing the color plug from its socket on rear of chassis.

VIDEO IF ALIGNMENT

Remove the converter tube (V2) from its socket and replace with a 6J6 which has pin 1 removed. This will disable the local oscillator and reduce the possibility of erroneous indication.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
1.	Direct	High side to an ungrounded tube shield floating over dummy converter tube. Low side to chassis.	25.4MC (Unmod)	Any	DC probe to point (A). Common to chassis.	A1, A2	Adjust for maximum deflection. Attenuate generator to maintain 3 volts at VTVM.
2.	"	"	22.25MC	"	"	A3, A4	"
3.	"	"	23.6MC	"	"	A5	"
4.	"	"	21.25MC	"	"	A6	Adjust for MINIMUM deflection.

OVERALL VIDEO IF RESPONSE CHECK

Connect the negative lead of a 3 volt battery to the ungrounded side of C62. Connect the positive lead to chassis.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
5.	Direct	High side to an ungrounded tube shield floating over dummy converter tube. Low side to chassis.	24MC (10MC Swp)	21.25MC 25.75MC	Any	Vert. Amp. thru 10KΩ to point (A). Low side to chassis.		Check for response similar to Fig. 1. If necessary, retouch A1 thru A5 for desired response.

SOUND IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

Connect two matched 100KΩ (± 1%) resistors in series from point (B) to chassis. The junction of these two resistors is alignment point (D) as shown on the schematic.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
6.	.01MFD	High side to point (A). Low side to chassis.	4.5MC (Unmod)	Any	DC probe to point (B). Common to chassis.	A7, A8, A9	Adjust for maximum deflection.
7.	"	"	"	"	DC probe to point (C). Common to point (D).	A10	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.

SOUND IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use frequency modulated signal with 60% modulation and 450KC sweep. Use 120% sawtooth voltage in scope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
6.	.01MFD	High side to point (A). Low side to chassis.	4.5MC (450KC Swp)	4.5MC	Any	Vert. Amp. to point (B). Low side to chassis.	A7, A8, A9	Disconnect stabilizer capacitor C9. Adjust for curve of maximum amplitude and symmetry as in Fig. 2.
7.	"	"	"	"	"	Vert. Amp. to point (C). Low side to chassis.	A10	Reconnect stabilizer capacitor C9. Adjust so that 4.5MC occurs at center of crossover lines as in Fig. 3. SLIGHTLY retouch A9 for maximum amplitude and straightness of crossover lines.

4.5MC TRAP ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
8.	.01MFD	High side to point (A). Low side to chassis.	4.5MC (Unmod.)	Any	Not used	All	If A-11 is misadjusted a 4.5MC dot pattern will be visible on the picture screen. Adjust A-11 for MINIMUM dot pattern.

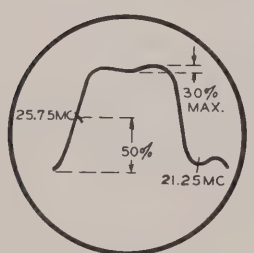

FIG.1

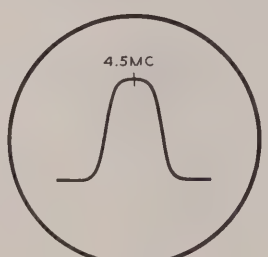

FIG.2

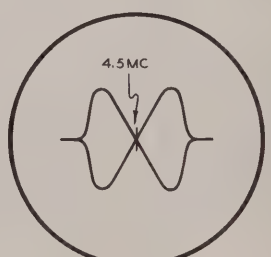

FIG. 3

OSCILLATOR ALIGNMENT

Remove the dummy converter tube and replace the original 6J6 in its socket.
The channel oscillator adjustment screws are reached through a hole at the upper right of the channel switch shaft. The correct adjustment screw is accessible through this hole as the channel switch is turned to each channel.
Connect the bias battery as under video IF alignment.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50Ω.
Set the fine tuning control to the mid-position of its range.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
9.	Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead.	213MC (10MC Swp)	211.25MC 215.75MC	13	Vert. Amp. to point (A). Low side to chassis.	A12	Adjust to place sound marker in trap notch as in Fig. 4. Video marker should be at 50%.
			207MC (10MC Swp)	205.25MC 209.75MC	12		A13	
			201MC (10MC Swp)	199.25MC 203.75MC	11		A14	
			195MC (10MC Swp)	193.25MC 197.75MC	10		A15	
			189MC (10MC Swp)	187.25MC 191.75MC	9		A16	
			183MC (10MC Swp)	181.25MC 185.75MC	8		A17	
			177MC (10MC Swp)	175.25MC 179.75MC	7		A18	
			85MC (10MC Swp)	83.25MC 87.75MC	6		A19	
			79MC (10MC Swp)	77.25MC 81.75MC	5		A20	
			69MC (10MC Swp)	67.25MC 71.75MC	4		A21	
			63MC (10MC Swp)	61.25MC 65.75MC	3		A22	
			57MC (10MC Swp)	55.25MC 59.75MC	2		A23	

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RF AND MIXER ALIGNMENT

Connect the bias battery as under video IF alignment.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50Ω.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
10.	Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead.	207MC (10MC Swp)	205.25MC 209.75MC	12	Vert. Amp. thru 10KΩ to point (E). Low side to chassis.	A24 A25 A26	Adjust for maximum response with band width similar to Fig. 5.
11.	"	"	213MC (10MC Swp)	211.25MC 215.75MC	13			Check for response similar to Fig. 5. If markers fall below 70% on any channel make slight compromise adjustments of A24, A25 and A26 with channel switch set to that channel, then recheck all other channels to see that they have not been seriously affected.
			201MC (10MC Swp)	199.25MC 203.75MC	11			
			195MC (10MC Swp)	193.25MC 197.75MC	10			
			189MC (10MC Swp)	187.25MC 191.75MC	9			
			183MC (10MC Swp)	181.25MC 185.75MC	8			
			177MC (10MC Swp)	175.25MC 179.75MC	7			
			85MC (10MC Swp)	83.25MC 87.75MC	6			
			79MC (10MC Swp)	77.25MC 81.75MC	5			
			69MC (10MC Swp)	67.25MC 71.75MC	4			
			63MC (10MC Swp)	61.25MC 65.75MC	3			
			57MC (10MC Swp)	55.25MC 59.75MC	2			

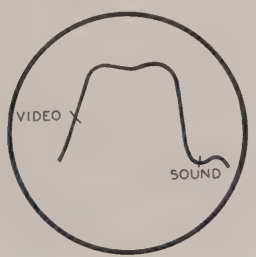


FIG. 4

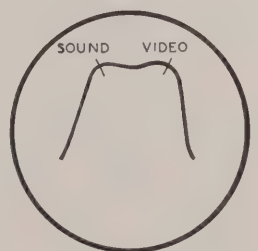
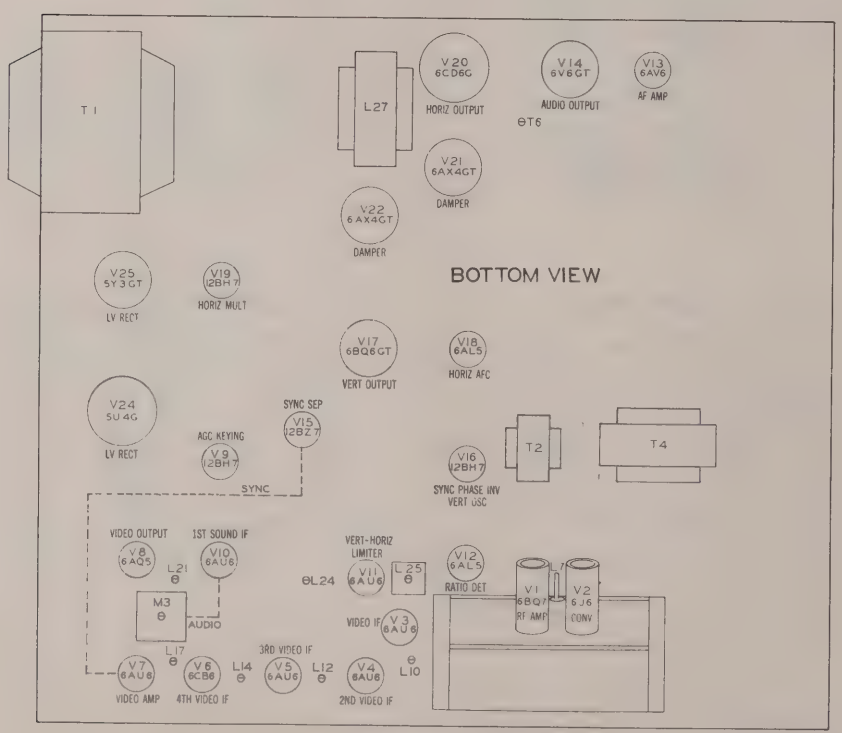


FIG. 5

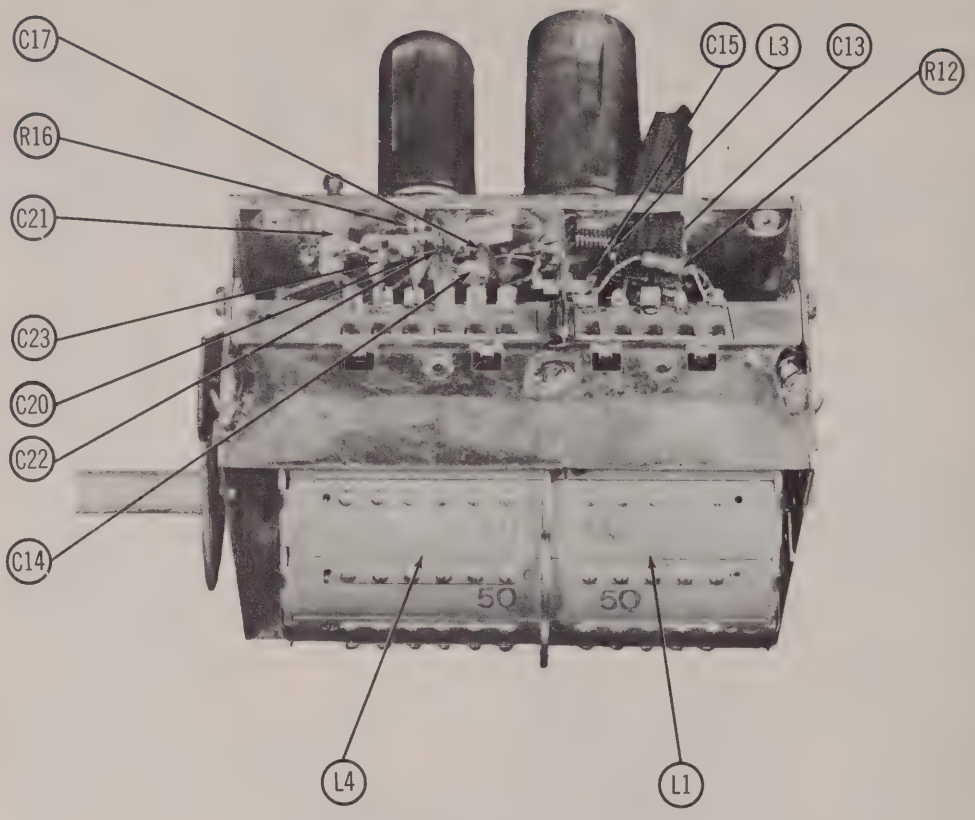
RESISTANCE MEASUREMENTS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6BQ7	INF	100KΩ	0Ω	.1Ω	0Ω	# 4KΩ	150KΩ	INF	0Ω
V 2	6J6	† 15KΩ	† 300Ω	.1Ω	0Ω	230KΩ	10KΩ	0Ω		
V 3	6AU6	63KΩ	0Ω	.1Ω	0Ω	† 630Ω	† 630Ω	82Ω		
V 4	6AU6	68KΩ	0Ω	.1Ω	0Ω	† 630Ω	† 630Ω	82Ω		
V 5	6AU6	62K	0Ω	.1Ω	0Ω	† 630Ω	† 630Ω	82Ω		
V 6	6CB6	2. 5Ω	220Ω	.1Ω	0Ω	† 630Ω	† 630Ω	0Ω		
V 7	6AU6	3. 9KΩ	0Ω	.1Ω	0Ω	† 8. 6KΩ	† 5. 9KΩ	0Ω		
V 8	6AQ5	470KΩ	3KΩ	0Ω	.1Ω	# 7. 3KΩ	† 300Ω	470KΩ		
V 9	6AU6	† 42KΩ	† 5. 9KΩ	0Ω	.1Ω	130KΩ	# 63Ω	† 5. 9KΩ		
V 10	6AU6	2Ω	0Ω	0Ω	.1Ω	† 8. 5KΩ	† 8. 5KΩ	82Ω		
V 11	6AU6	100KΩ	0Ω	.1Ω	0Ω	† 3KΩ	† 100KΩ	0Ω		
V 12	6AL5	INF	INF	1Ω	.1Ω	0Ω	0Ω	33KΩ		
V 13	6AV6	100KΩ	820Ω	0Ω	.1Ω	0Ω	0Ω	# 220KΩ		
V 14	6V6GT	INF	0Ω	# 1. 9KΩ	† 1. 5KΩ	470KΩ	10Meg	.1Ω	330Ω	
V 15	12BZ7	† 8. 5KΩ	2. 7Meg	0Ω	.1Ω	.1Ω	† 8. 5KΩ	2. 7Meg	0Ω	0Ω
V 16	12BH7	# 1. 6Meg	1. 4Meg	0Ω	.1Ω	.1Ω	† 6. 3KΩ	1Meg	2. 7KΩ	0Ω
V 17	6BQ6GT	15KΩ	.1Ω	50KΩ	50KΩ	700KΩ	230KΩ	0Ω	0Ω	TOP CAP # 993Ω
V 18	6AL5	3. 4Meg	3. 4Meg	1Ω	0Ω	27KΩ	0Ω	27KΩ		
V 19	12BH7	# 155KΩ	100KΩ	1. 8KΩ	.1Ω	.1Ω	# 11. 6KΩ	3. 8Meg	1. 8KΩ	0Ω
V 20	6CD6G	# 10KΩ	0Ω	180Ω	450KΩ	450KΩ	INF	.1Ω	# 10. 1KΩ	TOP CAP ▲ 9Ω
V 21	6AX4GT	INF	INF	5Meg	INF	# 65Ω	# 60Ω	.1Ω	0Ω	
V 22	6AX4GT	3. 9Meg	INF	5Meg	INF	# 65Ω	4. 9Meg	.1Ω	0Ω	
V 23	1B3GT	PINS 1-8 HAVE INF. RESISTANCE								TOP CAP ▲ 418Ω
V 24	5U4G	INF	40KΩ	INF	80Ω	INF	80Ω	INF	40KΩ	
V 25	5Y3GT	470KΩ	20KΩ	▲ 10Ω	73Ω	INF	73Ω	INF	20KΩ	
V 26	27EP4	0Ω	1Meg	PIN 10 ▲ 1Meg	PIN 11 260KΩ	PIN 12 .1Ω				

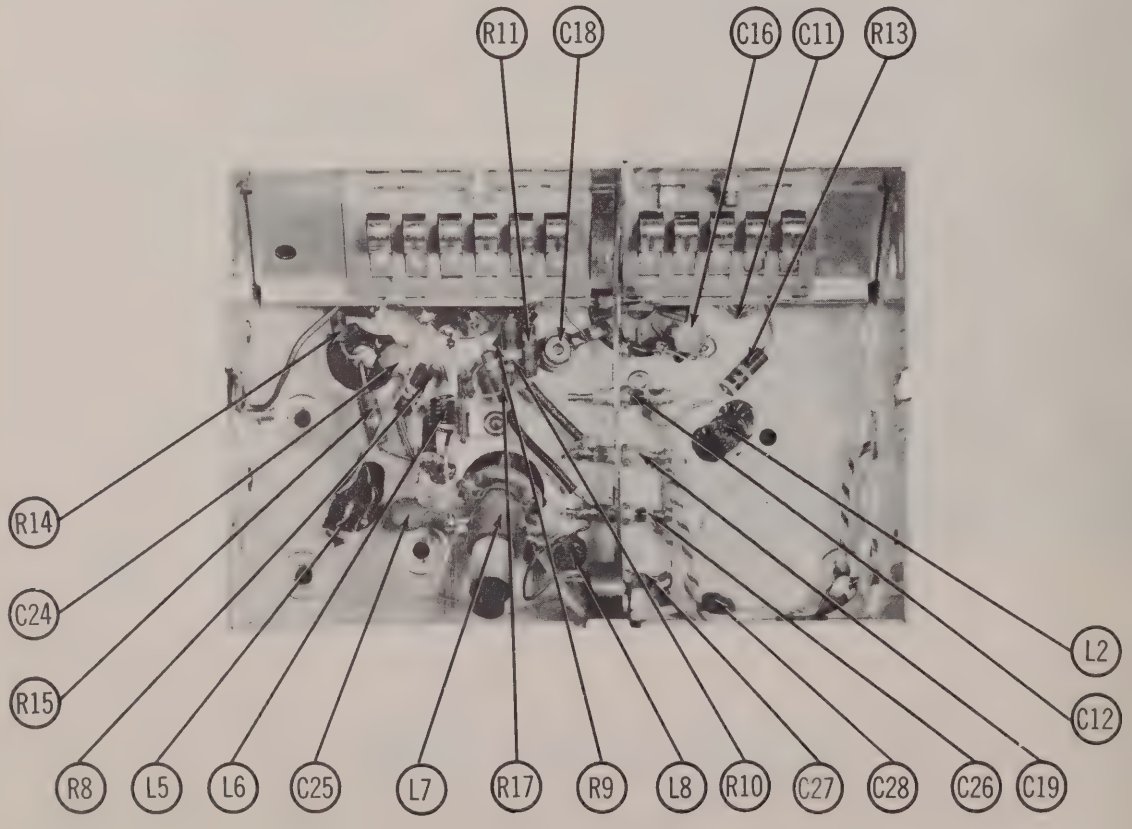
† MEASURED FROM PIN 8 OF V25.
# MEASURED FROM PIN 8 OF V24.
▲ MEASURED FROM PIN 3 OF V22.



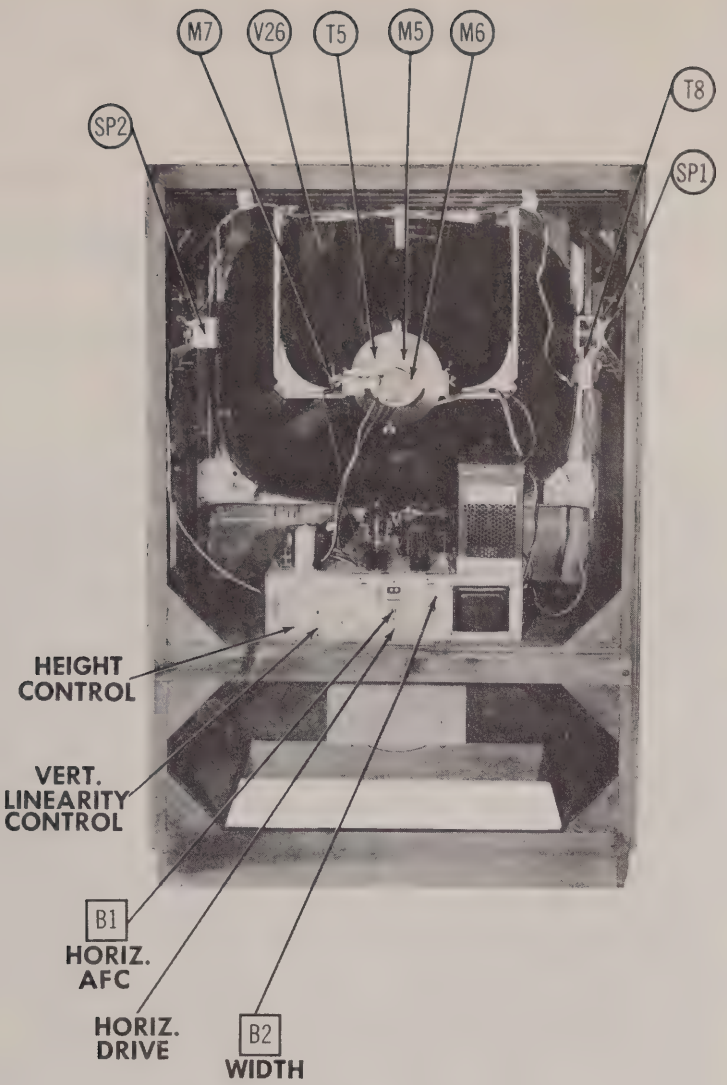
TUBE PLACEMENT CHART



RF TUNER-RIGHT SIDE



RF TUNER-BOTTOM VIEW



CABINET—REAR VIEW

PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Turn the set on and tune in a TV station, preferably a test pattern.

If horizontal hold control fails to maintain sync, set it in the middle of its range and adjust the horizontal AFC slug (B1) until the picture is in sync.

Check other channels and, if necessary, readjust B1 slightly for best sync on all channels.

Adjust the horizontal drive control clockwise as far as possible without the presence of a vertical white line or compression of the center of the picture.

Adjust the horizontal size slug (B2) for a picture slightly wider than necessary to fill the picture mask horizontally.

Adjust the horizontal linearity slug (B3) for a picture that is symmetrical from left to right.

If the anti-pincusion magnets require adjustment, the horizontal centering and horizontal size (B2) must be adjusted so that one edge of the caster is visible.

Adjust the proper magnet for straightest raster edge. Repeat procedure for opposite edge of raster. Return centering and horizontal size slug to normal settings.

TROUBLE SHOOTING AIDS

SWEEP

HORIZONTAL

LOSS OF SWEEP

Follow procedure outlined under "Loss Of High Voltage".

INSUFFICIENT SWEEP

Check by substitution V19, V20, V21, V22 and V24. Check adjustment of the horizontal drive control, B2 and B3. Check waveform W16.

If Satisfactory	If Unsatisfactory
Check C91, C93, C94, R112, R113, R117, R118, T3, T5A and other associated circuit components.	Check C85, C86, C87, C88, C89, C90, R104, R105, R108, R7 and other associated circuit components.

DRIVE LINES

Check by substitution V19, V20, V21 and V22. Check adjustment of horizontal drive control. Check C87, C89, C90, C93, C94, T3, T5A and other associated circuit components.

COMPRESSED LEFT SIDE

Check by substitution V20, V21 and V22. Check horizontal output and damper circuit components especially T3 and T5A.

FOLDS

Follow procedure outlined under "Drive Lines".

XMAS TREE EFFECT

Substitute V19. Check C85, C86, L26 and other associated circuit components.

VERTICAL

LOSS OF SWEEP

Check by substitution V16 and V17. Check waveform W10.

If Satisfactory	If Unsatisfactory
Check R87, R89, R90, T4, T5B and other associated circuit components.	Check C73, C74, R84, R85, R91 and other associated circuit components.

INSUFFICIENT SWEEP

Check adjustment of height and vertical linearity controls. Follow procedure outlined under "Loss Of Sweep".

COMPRESSED AT TOP

Check by substitution V16 and V17. Check T4, T5B and other associated circuit components for failure or change of value.

COMPRESSED AT BOTTOM

Check by substitution V16 and V17. Check components associated with these stages especially C73 and C74.

FOLDS

Check by substitution V16 and V17. Check C73 and C74. Check R85 and R86. Check other associated components.

SYNC

LOSS OF HORIZONTAL AND VERTICAL SYNC

Check by substitution V15 and V16. Check components associated with V15 and V16A.

LOSS OF HORIZONTAL SYNC - VERTICAL SYNC SATISFACTORY

Check by substitution V18 and V19. Check associated circuit components especially components associated with V19 for failure or change of value.

LOSS OF VERTICAL SYNC - HORIZONTAL SYNC SATISFACTORY

Check by substitution V15 and V16. Check waveform W8.

If Satisfactory	If Unsatisfactory
Check components associated with V16B.	Check components associated with V15 and V16A.

HORIZONTAL BENDING

Check by substitution V18, V19 and V20. Check the horizontal AFC filter network (R97, R100, C82 and C83) for failure or change of value.

VIDEO

LOSS OF VIDEO

Check by substitution V7 and V8. Check waveform W3.

If Satisfactory	If Unsatisfactory
Check picture tube and associated circuit components.	Check components associated with V7 and V8.

SOUND BARS (4.5 MC BEAT)

Check setting of fine tuning control. Check adjustment A11. Check video IF alignment.

POOR CONTRAST

Check by substitution V7 and V8. Check video detector crystal and assembly. Check picture tube and other associated circuit components.

NEGATIVE PIX

Check by substitution V7, V8 and V9. Check video detector crystal and assembly. Check picture tube and other associated circuit components.

SMEAR

Check by substitution V7 and V8. Check video detector crystal. Check C45, C48, R37, R45, R42, R43, R36, L18, L19, L22, L23, picture tube and other associated circuit components.

WIDE BLACK BAR ACROSS PIX

Check V1, V2, V3, V4, V5, V6, V7 and V8 for heater to cathode leakage.

AUDIO

WEAK OR NO SOUND

Check by substitution V10, V11, V12, V13 and V14. Check stages V13 and V14 using an audio signal generator. Apply audio signal across R4B.

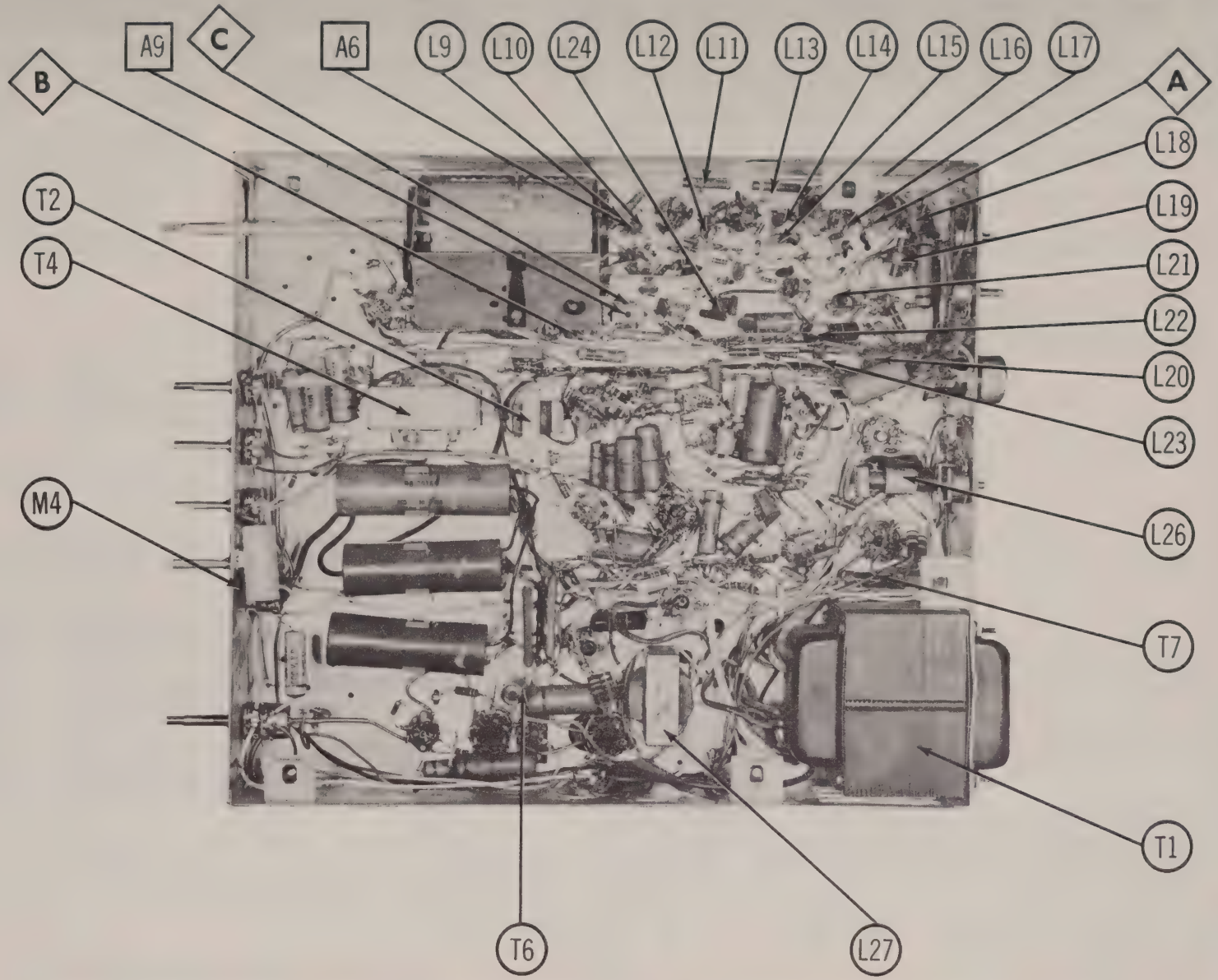
If Satisfactory	If Unsatisfactory
Check ratio detector and audio IF alignment and components.	Check components associated with V13 and V14.

BUZZ

Check fine tuning adjustment. Adjust A10 for minimum buzz. If buzz is still objectionable substitute V12 and realign audio IF and ratio detector. Check C9 and C57.

DISTORTED

Follow procedure outlined under "Weak Or No Sound".



CHASSIS BOTTOM VIEW-TRANS., INDUCTOR AND ALIGNMENT IDENTIFICATION

PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

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3924 MEADE ST.
DENVER, COLORADO

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA: FIRESTONE PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RETMA BASE TYPE	NOTES
V1	RF Amplifier	6BQ7	6BQ7	9A	
V2	Converter	6J8	6J8	TBF	
V3	1st Video IF Amp.	6AU6	6AU6	TBK	
V4	2nd Video IF Amp.	6AU6	6AU6	TBK	
V5	3rd Video IF Amp.	6AU6	6AU6	TBK	
V6	4th Video IF Amp.	6CB6	6CB6	7CM	
V7	Video Amp.	6AU6	6AU6	TBK	
V8	Video Output	6AQ5	6AQ5	TBZ	
V9	AGC Keying	6AU6	6AU6	TBK	
V10	Sound IF Amp.	6AU6	6AU6	TBK	
V11	Limiter	6AU6	6AU6	TBK	
V12	Ratio Detector	6AL5	6AL5	6BT	
V13	AF Amplifier	6AV6	6AV6	7BT	
V14	Audio Output	6V6GT	6V6GT	7B	
V15	Vert. Sync Sep. - Horiz. Sync Sep.	12BE7	12BE7	9A	
V16	Sync Phase Inv. - Vert. Oscillator	12BH7	12BH7	9A	
V17	Vert. Output	6BQ6GT	6BQ6GT	8AM	
V18	Horiz. AFC	6AL5	6AL5	6BT	
V19	Horiz. Mult.	12BH7	12BH7	9A	
V20	Horiz. Output	6CD6G	6CD6G	5BT	
V21	Damper	6AX4GT	6AX4GT	4CG	
V22	Damper	6AX4GT	6AX4GT	4CG	
V23	HV Rectifier	1B3GT	1B3GT	3C	
V24	LV Rectifier	5U4G	5U4G	5T	
V25	LV Rectifier	5Y3GT	5Y3GT	5T	

CATHODE-RAY TUBE

ITEM No.	FIRESTONE PART No.	REPLACEMENT DATA: SYLVANIA PART No.	REPLACEMENT DATA: GENERAL ELECTRIC PART No.	REPLACEMENT DATA: WESTINGHOUSE PART No.	RETMA BASE TYPE	NOTES
V26	21EP4	21EP4 21GP4 21HP4 ①	21EP4		12D 12D 12D	① Circuit changes necessary.

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No	RATING CAP.	RATING VOLT	REPLACEMENT DATA: FIRESTONE PART No.	REPLACEMENT DATA: AEROVOX PART No.	REPLACEMENT DATA: CENTRALAB PART No.	REPLACEMENT DATA: CORNELL-DUBILIER PART No.	REPLACEMENT DATA: ERIE PART No.	REPLACEMENT DATA: MALLORY PART No.	REPLACEMENT DATA: SPRAGUE PART No.	NOTES
C1A	80	250	A30173	AFH3-26		CO20		FP331.3	TVL-3642	Brown Orange Yellow Red Blue Green Red Yellow
B	120	250								
C2A	20	450								
B	20	450	A30172	AFH3-36		CO27		FP378.5	TVL-3780	
C	20	450		PRS450/10		BR1045		TC72	TVA-1705	
D	10	450								
C3A	80	450	A30189	AFH3-142		C109		FP-375	TVA-1716	
B	100	50							TVA-1310	
C4	4	50	A30149	PRS150/4		BR550		TC30	TVA-1303	
C5	10	250	A30145	PRS350/10		BR1025		TC52	TVA-1504	
C6	4	50	A30149	PRS150/4		BR550		TC30	TVA-1303	
C7	10	250	A30145	PRS350/10		BR1025		TC52	TVA-1504	
C8	1	50	A30138	E26E73		BBR-1-50T		TC31	TVA-1300	
C9	4	50	A30149	PRS150/4		BR550		TC30	TVA-1303	
C10	10	250	A30145	PRS350/10		BR1025		TC52	TVA-1504	
C11	3-9				829-10					
C12	800			EF-001	MFT-1000				503C-D1	
C13	3.6									
C14	47			BPD-000047	D6-470		GPIK-470	UC-5447	5GA-Q47	
C15	900			EF-001	MFT-1000				503C-D1	
C16	1000			BPD-001	D6-102	TM5D1	801-001	DC-521	5HK-D1	
C17	1.5									
C18	3-3				829-3			CT565A		
C19	800			EF-001	MFT-1000				503C-D1	
C20	47			BPD-000047	D6-470		GPIK-470	UC-5447	5GA-Q47	
C21	3-3				829-3			CT565A		
C22	10			SIIONP0	TC2-10		NP0K-100	ZT-541	5TCC-Q1	
C23	5			SI5N750			N750K-050		5TCUB-V47	
C24	1000			BPD-001	D6-102	TM5D1	801-001	DC-521	5HK-D1	
C25	6.8			S IS.ENPO	TC2-6.8		NP0K-6R8	ZT-5568	5TCCB-V68	
C26	800			EF-001	MFT-1000				503C-D1	
C27	800			EF-001	MFT-1000				503C-D1	
C28	130			BPD-00012	D6-121	TM5T12	GP2K-121	UC-5312	5GA-T12	
C29A	5000		A19183	BPD-0047	DD2-502	TM5DD5	81l-005	DC-525	5HK-3D47	
B	5000						81l-005	DC-525		
C30	1500		A19148	BPD-0015	D6-152	TM5D15	801-0015	DC-5215	5HK-D15	
C31	5000			BPD-005	MD-502	TM5D5	81l-005	DC-525	5HK-D5	
C32	100		A556-118-2	SI100	D6-101	TM5T5	GPIK-101	UC-531	5GA-T1	
C33	100			1469-0001		SR5T1		MC B235	MS-31	
C34	1500		A19148	BPD-0015	DD-152	TM5D15	801-0015	DC-5215	5HK-D15	
C35	5000		A19109	BPD-005	DD-502	TM5D5	81l-005	DC-525	5HK-D5	
C36	100		A556-118-2	SI100	D6-101	TM5T5	GPIK-101	UC-531	5GA-T1	
C37	5000		A19109	BPD-005	MD-502	TM5D5	81l-005	DC-525	5HK-D5	
C38	1500		A19148	BPD-0015	D6-512	TM5D15	801-0015	DC-5215	5HK-D15	
C39	5000		A19109	BPD-005	DD-502	TM5D5	81l-005	DC-525	5HK-D5	
C40	100		A556-118-2	SI100	D6-102		GPIK-101	UC-531	5GA-T1	
C41A	5000		A19183	BPD-0047	DD2-502	TM5DD5	81l-005	DC-525	5HK-3D47	
B	5000						81l-005	DC-525		
C42	680	500		A190-143	1464-00075				MS-37	
C43	5000			A19109	BPD-005	DD-502	TM5D5	81l-005	DC-525	5HK-D5
C44	5000			A19109	BPD-005	DD-502	TM5D5	81l-005	DC-525	5HK-D5
C45	.05	600		A194-160	P688-05	DF-503	PTE685		PT615	6TM-S5
C46	120	500		A190-125	1469-001		SR5T1		MCB235	MS-31
C47	47	500		A555-123	1469-0000 5		SR5Q5		MCB225	MS-45
C48	.047	600		A197-160	P688-047	DF-503	PTE6S47		PT6147	6TM-S47
C49A	5000		A19163	BPD-0047	DD2-502	TM5DD5	81l-005	DC-525	5HK-3D47	
B	5000						81l-005	DC-525		
C50	47	500		1469-00005		SR5Q5		MC B225	MS-45	
C51	5000		A19109	BPD-005	DD-502	TM5D5	81l-005	DC-525	5HK-D5	

CAPACITORS (cont)

ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA: FIRESTONE PART No.	REPLACEMENT DATA: AEROVOX PART No.	REPLACEMENT DATA: CENTRALAB PART No.	REPLACEMENT DATA: CORNELL-DUBILIER PART No.	REPLACEMENT DATA: ERIE PART No.	REPLACEMENT DATA: MALLORY PART No.	REPLACEMENT DATA: SPRAGUE PART No.	NOTES
C52	5000			A19109	DPD-005	DD-502	TM5D5	81l-005	DC-525	5HK-D5
C53	5000			A19109	BPD-005	DD-502	TM5D5	81l-005	DC-525	5HK-D5
C54	.000			A555-136-2						
C55	510			A558-238						
C56	220	500		A55-123	1479-00025		SR5T25		MCB237	MS-33
C57	1500		A19148	BPD-0015	DD-152	TM5D15	801-0015	DC-5215	5HK-D15	
C58	.005	600		A194-160	P688-05	DF-503	PTE685		PT615	6TM-S5
C59	.05	600		A194-160	P688-05	DF-503	PTE685		PT615	6TM-S5
C60	.1	600		A19216	P688-1	DF-104	PTE6P1		PT601	6TM-P1
C61	1.0	600		A194-21					PT41	2TM-M1
C62	.01	600		A194-155	P688-01	D6-103	PTE6S1	GP2-333-103	PT611	6TM-S1
C63	.02	600		A194-156	P688-02	DF-203	PTE6S2		PT612	6TM-S2
C64	390	500		A190-137	1479-0004		SR5T4		MCB243	MS-34
C65	270	500		A190-133	1479-0003		SR5T3		MCB241	MS-33
C66	.01	600		A194-155	P688-01	D6-103	PTE6S1	GP2-333-103	PT611	6TM-S1
C67	.005	600		A194-154	P688-005	D6-502	PTE6D5	GP2-333-502	PT625	6TM-D5
C68	.005	600		A194-151	P688-005	D6-502	PTE6D5	GP2-333-502	PT625	6TM-D5
C69	.01	600		A194-15 5	P688-01	D6-103	PTE6S1	GP2-333-103	PT611	6TM-S1
C70	4700	300		A192-163	1464-005		IDR5D5		MCB265	MS-35
C71	.001	600		A197-145	P688-001	D6-102	PTE6D1	GP2K-102	PT631	6TM-D1
C72	510	500		A190-140	1479-0005		SR5T5		MCB245	MS-35
C73	.1	600		A194-162	P688-1	DF-104	PTE6P1		PT601	6TM-P1
C74	.1	600		A194-162	P688-1	DF-104	PTE6P1		PT601	6TM-P1
C75	.02	600		A194-156	P688-02	DF-203	PTE6S2		PT612	6TM-S2
C76	.1	600		A194-162	P688-1	DF-104	PTE6P1		PT601	6TM-P1
C77	.1	600		A194-162	P688-1	DF-104	PTE6P1		PT601	6TM-P1
C78	.002	600		A194-146	P688-002	D6-202	PTE6D2	GP2L-202	PT622	6TM-D2
C79	.002	600		A197-146	P688-002	D6-202	PTE6D2	GP2L-202	PT622	6TM-D2
C80	.001	600		A194-146	P688-001	D6-102	PTE6D1	GP2L-102	PT621	6TM-D1
C81	.001	600		A194-145	P688-001	D6-102	PTE6D1	GP2L-102	PT621	6TM-D1
C82	.005	600		A197-151	P688-005	D6-502	PTE6D5	GP2-333-502	PT625	6TM-D5
C83	.05	600		A194-160	P688-05	DF-503	PTE685		PT615	6TM-S5
C84	470	500		A190-139	1479-0005		SR5T5		MCB245	MS-35
C85	470	500		A190-139	1479-0005		SR5T5		MCB245	MS-35
C86	3900	500		A195-261	1464-004		IDR5D4		MCB263	MS-34
C87	82	500		A190-121						
C88	270	500		A190-133	1479-0003		SR5T3		MCB241	MS-33
C89	470	500		A190-139	1479-0005		SR5T5		MCB245	MS-35
C90	680	500		A190-143	1479-0007		SR5T7		MCB247	MS-37
C91	.25	400		A197-115	P688-25		PTE6P25		PT625	6TM-P25
C92	.002	1000		A197-194	P1088-002		PTE6D2		PT622	MB-D2
C93	.047	600		A197-160	P688-047		PTE6S47		PT6147	6TM-S47
C94	.05	600		A197-160	P688-05		PTE6S5		PT615	6TM-S5
C95	220	2500		A191-36						
C96	.1	500		A194-162	P688-1	DF-104	PTE6P1		PT601	6TM-P1
C97	500	30KV		A1975-4		TV4-503				
C98	5000			A19109	BPD-006	MD-502	TM5D5	81l-005	DC-525	5HK-D5
C99	5000			A19109	BPD-005	MD-502	TM5D5	81l-005	DC-525	5HK-D5
C100	.01	600			6892X-01		PTE6S1		PT611	6TM-S1
C101	.01	600			6892X-01		PTE6S1		PT611	6TM-S1
C102	47			A556-113-2	S147NP0	TCE-47	NP0K-470		ZT-5447	STCC-Q47
C103	120	2000								

CONTROLS

ITEM No	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA: FIRESTONE PART No.	REPLACEMENT DATA: IRC PART No.	REPLACEMENT DATA: CLAROSTAT PART No.	REPLACEMENT DATA: CENTRALAB PART No.	REPLACEMENT DATA: MALLORY PART No.	INSTALLATION NOTES
R1A	2Meg	½	PA-24148	Q11-139	AG-85-S	B-75	U-58	Vert. Hold
B	Shaft		Not Req.	Not Req.	F8-3	Not Req.	Not Req.	Attach to R1A
R2A	5000Ω	½	PA-24137	Q11-114	AG-19-S	B-10	U-14	Horiz. Hold
B	Shaft		Not Req.	Not Req.	F8-3	Not Req.	Not Req.	Attach to R2A
R3A	100KΩ	½	PA-24134	Q11-128	AG-49-S	B-40	U-41	Brightness
B	Shaft		Not Req.	Not Req.	F8-3	Not Req.	Not Req.	Attach to R3A
R4A	5000Ω	½	PA-24136	* Q1423	RTV-393	U7S3R	U7S3R	Contrast (panel)
B	250KΩ		Not Req.			UR254A	UR254A †	Volume (rear)
C	Switch		Not Req.			U8-26	U8-26	Attach to R4B
R5A	1Meg	½	PA-2411-D	Q11-141	AG-85-S	AB-87	SU-67	Height
B	Shaft		Not Req.	Not Req.	FK8-1/4	AK-1	Not Req.	Attach to R5A
R6A	1Meg	½	PA-2411-C	Q11-137	AG-81-S	AB-89	SU-54	Vert. Linearity
B	Shaft		Not Req.	Not Req.	R8-3	AK-1	Not Req.	Attach to R6A
R7A	250KΩ	½	PA-24138	Q11 130	AC-55 S	AB-50	SU-46	Horiz. Drive
B	Shaft		Not Req.	Not Req.	FK8-1/4	AK-1	Not Req.	Attach to R7A

† Universal replacement (Mallory exact duplicate Part No. UE508).
* CONCENTREKIT EQUIVALENT KIT K-2 BASE ELEMENTS & SHAFTS B17-1I4 & P1-1I8 (Panel) B13-130 & R1-205 (Rear) & SWITCH 76-L.

RESISTORS

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA: FIRESTONE PART No.	REPLACEMENT DATA: IRC PART No.	NOTES
R8	180KΩ	½		BTS-180K	
R9	100KΩ	½		BTS-100K	
R10	100KΩ 5%	½		BTS-100K 5%	
R11	150Ω	½		BTS-150Ω	
R12	15KΩ	½		BTS-15K	
R13	47KΩ	½		BTS-47K	
R14	10KΩ	½		BTS-10K	
R15	220KΩ	½		BTS-220K	
R16	10KΩ	½		BTS-10K	
R17	15KΩ	½		BTS-15K	
R18	4700Ω	½	A231-1165	BTS-4700	
R19	82Ω	½	A231-1123	BTS-82	
R20	330Ω	½	A231-1137	BTS-330	
R21	330Ω	½	A231-1137	BTS-330	
R22	330Ω	½	A231-1137	BTS-330	
R23	8200Ω	½	A231-1171	BTS-8200	
R24	82Ω	½	A231-1123	BTS-82	
R25	330Ω	½	A231-1137	BTS-330	
R26	15KΩ	½	A231-1177	BTS-15K	
R27	4700Ω	½	A231-1165	BTS-4700	

RESISTORS (cont)

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA: FIRESTONE PART No.	REPLACEMENT DATA: IRC PART No.	NOTES
R28	82Ω	½	A231-1123	BTS-82	
R29	330Ω	½	A231-1137	BTS-330	
R30	6800Ω	½	A231-1169	BTS-6800	
R31	220Ω	½	A231-1133	BTS-220	
R32	330Ω	½	A231-1137	BTS-330	
R33	10KΩ	½	A231-1173	BTS-10K	
R34	10KΩ	½	A231-1173	BTS-10K	
R35	100Ω	½	A231-1149	BTS-1000	
R36	2700Ω	2	A233-1159	BTS-2700	
R37	470KΩ	1	A231-1213	BTS-470K	
R38	270Ω	1	A232-1135	BTA-270	
R39	120Ω	1	A231-1127	BTS-120	
R40	3300Ω	1	A231-1161	BTS-3300	
R41	4700Ω	1	A231-1165	BTS-4700	
R42	6800Ω	2		BTS-6800	
R43	10KΩ	2		BTS-10K	
R44	220KΩ	1	A231-1205	BTS-220K	
R45	1Meg	1	A231-1221	BTS-1Meg	
R46	4700Ω	2	A233-1165	BTS-4700	
R47	4700Ω	1	A233-1165	BTS-4700	

RESISTORS (cont)

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA: FIRESTONE PART No.	REPLACEMENT DATA: IRC PART No.	NOTES
R48	5600Ω	½	A232-1167	BTA-5600	
R49	33KΩ	½	A231-1185	BTS-33K	
R50	12KΩ	½	A231-1175	BTS-12K	
R51	33KΩ	½	A231-1185	BTS-33K	
R52	56KΩ	½	A231-1191	BTS-56K	
R53	2700Ω	½	A231-1159	BTS-2700	
R54	82Ω	½	A231-1123	BTS-82	
R55	8200Ω	1	A232-1171	BTS-8200	Note 1
R56	100KΩ	½	A231-1197	BTS-100K	
R57	100KΩ	½	A231-1197	BTS-100K	
R58	2700Ω	½	A231-1159	BTS-2700	
R59	39KΩ	½	A231-1187	BTS-39K	
R60	560KΩ	½	A231-1215	BTS-560K	
R61	33KΩ	½	A231-1185	BTS-33K	
R62	82Ω	½		BTS-820	Note 2
R63	5600Ω	½		BTS-5600	Note 3
R64	220KΩ	½	A231-1205	BTS-220K	
R65	1500Ω	10	A2134-12		
R66	470KΩ	½	A231-1213	BTS-470K	
R67	330Ω	1	A232-1137	BTA-330	
R68	47Ω	½	A231-1117	BTS-47	
R69	470KΩ	½	A231-1213	BTS-470K	
R70	2.2Meg	½	A231-1239	BTS-2.2Meg	
R71	2.7Meg	½	A231-1231	BTS-2.7Meg	
R72	22KΩ	½	A231-1181	BTS-22K	
R73	8200Ω	½	A231-1171	BTS-8200	
R74	2700Ω	½	A232-1159	BTA-2700	
R75	1Meg	½	A231-1221	BTS-1Meg	
R76	22KΩ	½	A231-1181	BTS-22K	
R77	3300Ω	1	A232-1161	BTA-3300	
R78	2700Ω	1	A232-1159	BTA-2700	
R79	22KΩ	½	A231-1181	BTS-22K	
R80	8200Ω	½	A231-1171	BTS-8200	
R81	8200Ω	½	A231-1171	BTS-8200	
R82	820KΩ	½	A231-1219	BTS-820K	
R83	15KΩ	½		BTS-15K	
R84	470KΩ	½	A231-1213	BTS-470K	
R85	470KΩ	½	A231-1213	BTS-470K	
R86	470KΩ	½	A231-1213	BTS-470K	
R87	120Ω			BTS-120	

Note 1. Some models may use a 1800Ω resistor in this application.
Note 2. Some models may use a 3300Ω resistor in this application.
Note 3. Some models may use a 18KΩ resistor in this application.

TRANSFORMER (POWER)

ITEM No.	RATING PRI.	RATING SEC. 1	RATING SEC. 2	RATING SEC. 3	REPLACEMENT DATA: FIRESTONE PART No.	REPLACEMENT DATA: STANCOR PART No.	REPLACEMENT DATA: MERIT PART No.	REPLACEMENT DATA: Halldorson PART No.	REPLACEMENT DATA: TRIAD PART No.	REPLACEMENT DATA: RCA TYPE No.
T1	117VAC @ 2.36A	680VCT @ .330ADC tap @ 430VCT @ .090ADC	5VAC @ 3A	5VAC @ 2A SEC. 4 6.3VAC @ 2A	PC-10151					

TRANSFORMER (SWEEP CIRCUITS)

ITEM No.	RATING DC RESISTANCE PRI.	RATING DC RESISTANCE SEC.	REPLACEMENT DATA: FIRESTONE PART No.	REPLACEMENT DATA: STANCOR PART No.	REPLACEMENT DATA: MERIT PART No.	REPLACEMENT DATA: Halldorson PART No.	REPLACEMENT DATA: TRIAD PART No.	REPLACEMENT DATA: RCA TYPE No.	NOTES
T2	176Ω	100Ω	PB10106-2	A-8125	A-3003	B6702	A-97X	209T1 ①	Vert. Osc. Trans.
T3	435.3Ω	0Ω	PC10156					235T1	Horiz. Output Trans.
	tap ②								
	2.3Ω,								
	3.7Ω,								
	13.7Ω,								
	15.3Ω								
	23.3Ω								
T4	930Ω	6Ω	PC10154-1 PC10115-6 ①	A-8115 ②	A-3038	Z1803	A-107X ①		Vert. Output Trans.
T5A	14Ω				MDF-90			219D1 ③	Horiz. Deflection Coils
B	4Ω								Vert. Deflection Coils
T6	5Ω		PB28327	MWC-4 ④			WC-12 ⑤	213R1	Horiz. Lin. Coil
T7	2Ω		PB28318	MWC-2 ④			WC-12 ⑤	206R1	Width Coil

① Alternate vertical output transformers
② Drill one mounting hole.
③ Drill one new mounting hole.
④ Enlarge mounting hole.
⑤ Connect to coded blue and green terminals.
⑥ Do not use tap.
⑦ Connect to coded green and red terminals.
⑧ Use original deflection coil network.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE PRI.	IMPEDANCE SEC.	REPLACEMENT DATA: FIRESTONE PART No.	REPLACEMENT DATA: Stancor PART No.	REPLACEMENT DATA: Merit PART No.	REPLACEMENT DATA: Triad PART No.	REPLACEMENT DATA: Halldorson PART No.	REPLACEMENT DATA: Thordorson PART No.	NOTES
T8	5.6KΩ	1.8Ω		A-3849 ①	A-2930	S-5X	Z1109	36849 1	① Drill one new mounting hole.

SPEAKER

ITEM No.	RATINGS SIZE	RATINGS FIELD	RATINGS V. C. IMP.	REPLACEMENT DATA: FIRESTONE PART No.	REPLACEMENT DATA: JENSEN PART No.	REPLACEMENT DATA: QUAM PART No.	NOTES
SP1	6"	PM	3.6Ω	A-15832 ①	ST-108 Mod. P6-X ST-108 Mod. P6-X	6A21	① Audio output transformer is mounted on this speaker.
SP2	6"	PM	3.6Ω	A-15833		6A21	

PARTS LIST AND DESCRIPTIONS (Continued)

COILS (RF-IF)

ITEM No.	USE	DC RES.		REPLACEMENT DATA				NOTES
		PRI.	SEC.	FIRESTONE PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L1	Ant. Coils	0Ω CT	0Ω					
L2	Fil. Choke	0Ω						
L3	Neutr. Coil	0Ω						
L4	RF, Mixer Grid & Osc. Coils	0Ω						
L5	Fil. Choke	0Ω						
L6	RF Choke	0Ω						
L7	1st. Video IF	1.2Ω						
L8	RF Choke	1.2Ω						
L9	Fil. Choke	.27Ω		PA28276	19-3001	TV-189	6175	.82 Microhenry (IRC part #CL-1)
L10	2nd. Video IF	.2Ω		PB3392	17-1003	TV-102	6188	
L11	Fil. Choke	.27Ω		PA28276	19-3001	TV-189	6175	.82 Microhenry (IRC part #CL-1)
L12	3rd. Video IF	.5Ω		PB28320			6246	Includes trap
L13	Fil. Choke	.27Ω		PA28276	19-3001	TV-189	6175	.82 Microhenry (IRC part #CL-1)
L14	4th. Video IF	.2Ω		PB3392	17-1003	TV-102	6188	
L15	RF Choke	2.6Ω		PA28253			4626	21 Microhenries
L16	Fil. Choke	.27Ω		PA28276	19-3001	TV-189	6175	.82 Microhenry (IRC part #CL-1)
L17	5th. Video IF	.2Ω		PB3392	17-1004	TV-103	6189	
L18	Series Peaking Coil	9Ω		PC28255-2	19-3180	TV-184	6154	194 Microhenries
L19	Shunt Peaking Coil	13Ω		PC28255-8	19-3300	TV-185	6155	303 Microhenries
L20	Shunt Peaking Coil	5Ω		PC28255-1	19-3125	TV-181	4644	130 Microhenries
L21	4.5MC Trap	1.9Ω		PA28286	20-1004	TV-151	1470	
L22	Series Peaking Coil	5Ω		PC28255-1	19-3125	TV-181	4644	130 Microhenries
L23	Shunt Peaking Coil	10.5Ω		PC28255-11	19-3180	TV-184	6154	209 Microhenries
L24	Sound IF	1.9Ω		PA28286	17-3400	TV-151	1469	
L25	Ratio Det.	5.5Ω	1.8Ω CT	PB1201 *	17-3497	TV-115	6205	Tertiary winding -.7Ω
L26	Horiz. Osc.	50Ω		PA28263	19-1576	TV-163	6210	

*Alternate part #PB1202.

FILTER CHOKE

ITEM No.	RATINGS			REPLACEMENT DATA					
	TOTAL DIRECT CURRENT	D. C. RESISTANCE	INDUCTANCE (0 CURRENT 1000 ~)	FIRESTONE PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.
L27	.230ADC	62.5Ω	1.74 Hy.	PB-1406	C-2325 ①	C-2991①	C-21X①	C5037①	T-26C44①

① Drill one new mounting hole.

FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA					
			FIRESTONE PART No.		LITTELFUSE PART No.		BUSS PART No.	
			FUSE	HOLDER	FUSE	HOLDER	FUSE	HOLDER
M1	3AG S/B P/T				315.600 (3AG S/B P/T 6/10A)		MDV 6/10	

MISCELLANEOUS

ITEM No.	PART NAME	FIRESTONE PART No.	NOTES
M2	Tuner	PC541215	
M3	Video Detector	PB28321	Assembly, includes IN60 Crystal
M4	Switch	PA37111	Rotary wafer (local-distance-phono)
M5	Focus Magnet	PC3210	PM-includes centering lever and focus screw adj.
M6	Ion Trap		
M7	Correction Magnet		
	Cabinet	A60213	(2) used
	Back Cover	A62450	
	Knob	A39247-1	Local-distance-phono
	Knob	A39242-1	Channel Selector
	Knob	A39240-3	Fine tuning
	Knob	A39241-1	Off/on/volume
	Knob	A39239-3	Contrast
	Knob	A39246-1	(3) Vert. hold, horiz. hold and brightness
	Mask	A62449	
	Safety Glass	A62457-18	

TROUBLE SHOOTING AIDS (cont)

PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST
DENVER, COLORADO

POWER

DEAD SET

If filaments fail to light, check AC interlock assembly switch on volume control and T1. If filaments light, check fuse M1. Substitute V24 and V25. Check B+ filter and decoupling network components.

SMALL AND/OR DIM PIX

Substitute V24. Check B+ filter and decoupling network components.

HIGH VOLTAGE

LOSS OF HIGH VOLTAGE

Check by substitution V19, V20, V21, V22 and V23. Check waveform W16.

If Satisfactory	If Unsatisfactory
Check C97, R119, T3, T5A, R112, R113, C91 and other associated components.	Check C85, C88, C89, C90, R104, R105 and other associated components.

INSUFFICIENT HIGH VOLTAGE

Check by substitution V19, V20, V21, V22, V23 and V24. Follow procedure outlined under "Loss Of High Voltage".

BLOOMING

Check by substitution V19, V20, V21, V22, V23 and V24. Check C97, R119, T3, T5A, R112, R113, C91, picture tube and other associated circuit components.

GENERAL

RASTER SOUND NO PIX

Follow procedure outlined under "Loss Of Video".

RASTER NO SOUND NO PIX

Check by substitution V1, V2, V3, V4, V5 and V6. Check associated circuit components. Check video detector assembly.

NO RASTER NO SOUND

Follow procedure outlined under "Dead Set".

INTERMITTENT STREAKS

Check high voltage section for corona discharge and arcing.

Symptoms shown are assumed and are not indicative of the quality and workmanship of this equipment.

SERVICING IN THE FIELD

TUNER OSCILLATOR ADJUSTMENTS

Touch-up adjustments of the RF Tuner Oscillator Circuit may be accomplished by removal of the Channel Selector and Fine Tuning knobs. The adjustments are accessible, one at a time, through the small hole in the cabinet to the right of the Channel Selector shaft.

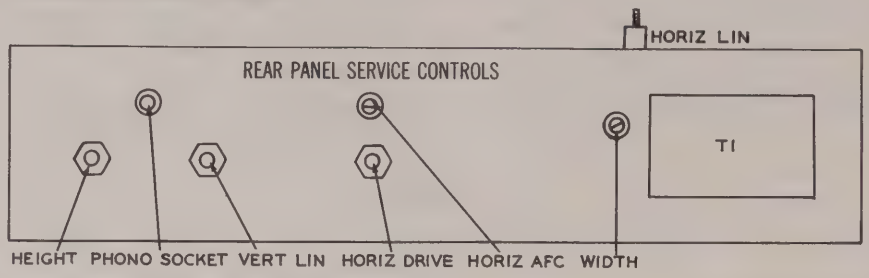
PICTURE TUBE SAFETY GLASS CLEANING

To clean safety glass remove three wood strips (top and sides) held in by three wood screws. Remove screws and strips and safety glass by tilting forward and lifting out. Use extreme caution when removing safety glass.

PICTURE TUBE REMOVAL

For picture tube removal it is necessary to remove chassis. (See disassembly instructions).

SERVICE ADJUSTMENT LOCATION



HORIZONTAL OSCILLATOR FIELD ADJUSTMENT

Adjustment of the Horiz. Oscillator Circuit can be made from the rear panel of the chassis. Set the Horiz. Hold Control at the Mid-position of its range and adjust the Horiz. AFC slug (L26) until the picture synchronizes horizontally.

SOUND IF DETECTOR BUZZ ADJUSTMENT

To eliminate Sound IF Detector Buzz, adjust the Ratio Detector Secondary (L25) located on top of chassis. (See tube placement chart).

FUSES

One fuse is used for L. V. Power Supply protection. (For location, see tube placement chart).

CENTERING

Centering is accomplished mechanically by means of a centering lever on the P. M. Focusing assembly. Adjust the centering lever from side to side, and up and down until the picture is properly centered.

ANTI-PIN CUSHION ADJUSTMENT

Reduce the picture size so that the sides of the raster are visible, and position the magnets so that all sides are straight lines and the corners are at right angles.

DISASSEMBLY INSTRUCTIONS

1. Remove 8 push on type control knobs from front panel.
2. Disconnect built-in antenna and transmission line from rear panel of cabinet.
3. Remove 13 wood and 1 metal screws. Remove rear cover .
4. Disconnect speakers, yoke plug, CRT socket, high voltage lead, speaker and yoke ground.
5. Remove 5 chassis bolts. Remove chassis.
6. Remove 4 speaker nuts and remove speaker (2 speakers).

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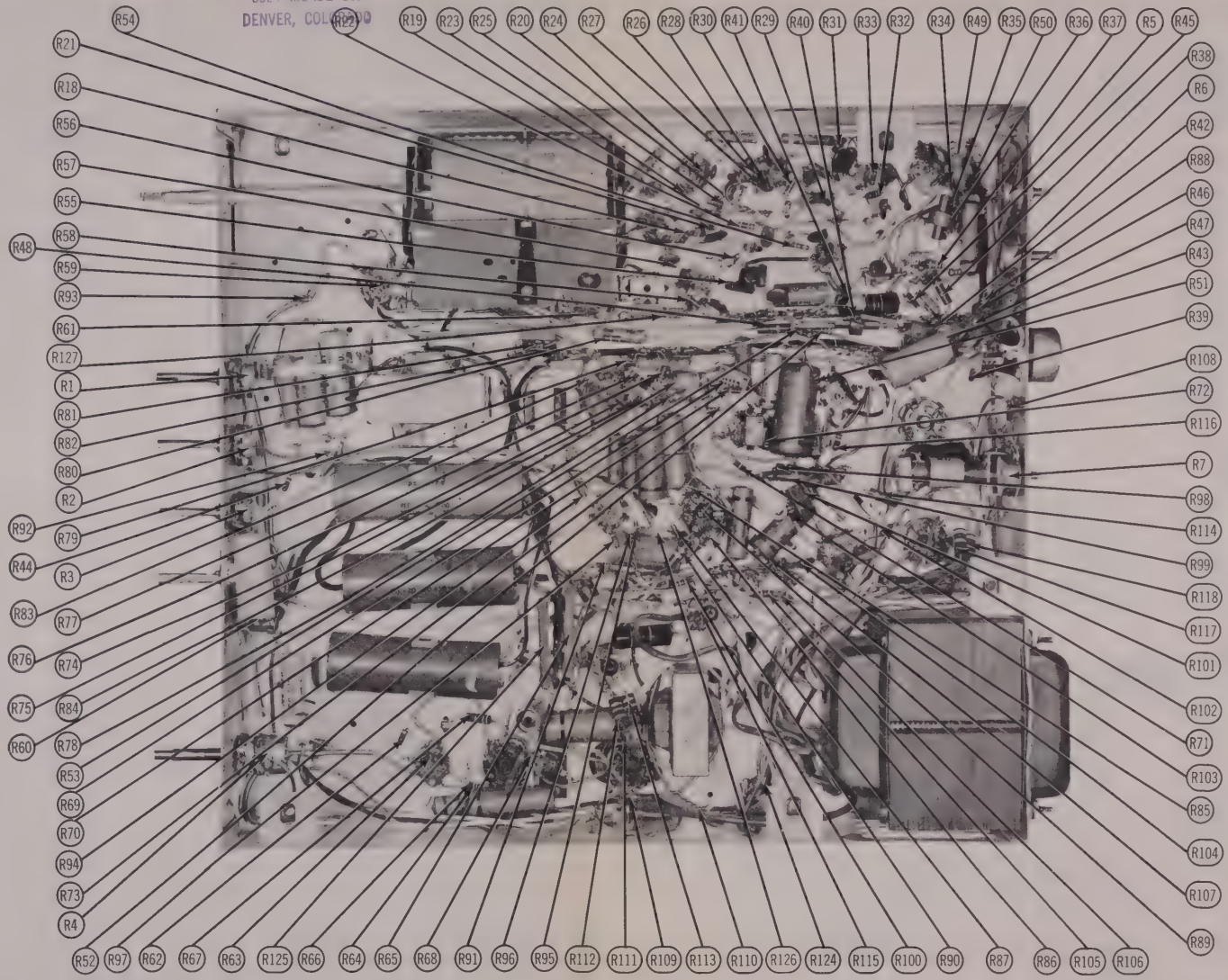
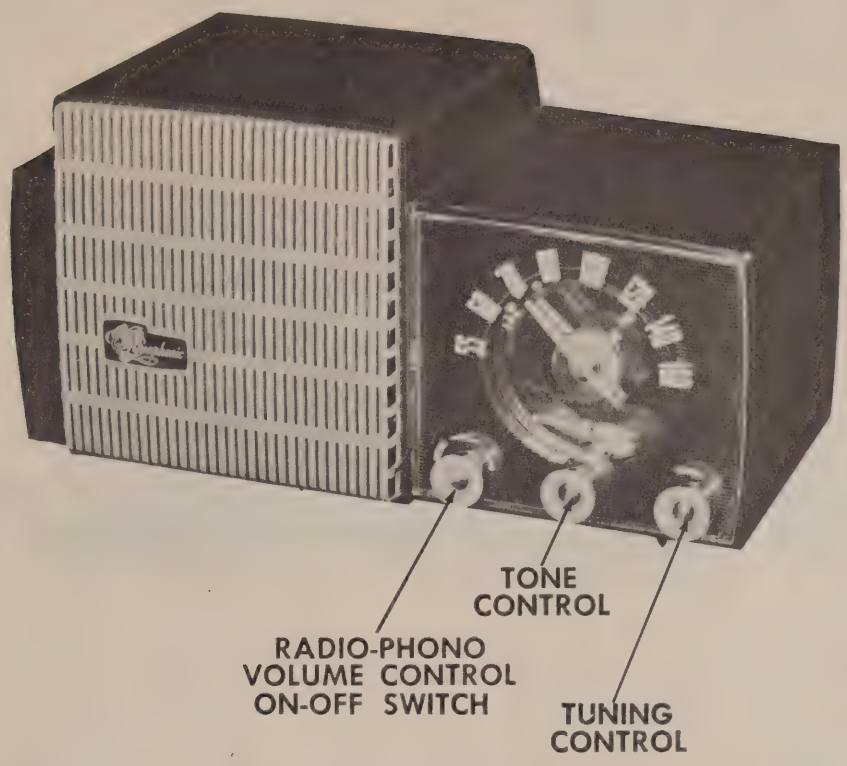
DENVER, COLO 80



CHASSIS BOTTOM VIEW-RESISTOR IDENTIFICATION

GENERAL ELECTRIC
MODELS 431, 432



GENERAL ELECTRIC
MODELS 431, 432

TRADE NAME	General Electric Models 431, 432
MANUFACTURER	General Electric Co., Electronics Dept., Electronics Park, Syracuse, N.Y.
TYPE SET	AC-DC Operated AM Superheterodyne Receiver
TUBES (Six)	Types 12BA6 RF Amp., 12BE6 Conv., 12BA6 IF Amp., 12AV6 Det.-AVC-AF Amp., 35C5 Audio Output, 35W4 Rectifier
POWER SUPPLY	105-120 Volts AC-DC RATING .26 Amp. @ 117 Volts AC
TUNING RANGE—BROADCAST	540-1600KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

With tuning gang fully closed set dial pointer to the left edge of "55" on the dial. Use isolation transformer, if available. If not, connect a .1MFD capacitor in series with low side of signal generator and B-. Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.05MFD	High side to pin 1 (grid) of 12BA6 (V3). Low side to B-.	455KC (400~Mod)	Tuning gang fully open	Across voice coil	A1, A2	Adjust for maximum output. If isolation transformer is not used, reduce dummy antenna to .001MFD to reduce hum modulation.
2.	"	High side to pin 7 (grid) of 12BE6 (V2). Low side to chassis.	"	"	"	A3, A4	Adjust for maximum output. If isolation transformer is not used, reduce dummy antenna to .001MFD to reduce hum modulation. Recheck A1 and A2.
3.		Loop	1620KC	"	"	A5	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
4.		"	1500KC	Tune to 1500KC signal	"	A6, A7	"
5.		"	600KC	Tune to 600KC signal	"	A8	Adjust for maximum deflection while rocking tuning gang thru 600KC signal. Repeat steps 3, 4 and 5.

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

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PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA: General Electric PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RETMA BASE TYPE	• NOTES
V1	RF-Amplifier	12BA6	12BA6	7BK	
V2	Converter	12BE6	12BE6	7CH	
V3	IF-Amplifier	12BA6	12BA6	7BK	
V4	Det-AF-Amplifier	12AV6	12AV6	7BT	
V5	Audio Output	35C5	35C5	7CV	
V6	Rectifier	35W4	35W4	5BQ	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: General Electric PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C1A	100	150	RCE-166	PRS150/80-40-20		BBRT44415		3N538	R1507	Red
B	50	150						TC42		Yellow
C2	.05	400	RRC-078	P488-05	DF-503	CUB4S5		PT415	4TM-S5	
C3	100		RCW-3079							
C4	2.7		RCW-3039							
C5	47		RCW-3075							
C6	100		RCW-3079							
C7A	220		♦RCW-3105	♦PA-247	D6-221	TP39			5GA-T22	
B	5000				DD-502	K080			5HK-D5	
C	400				D6-401	TP45			5GA-T4	
D	5000				DD-502	K080			5HK-D5	
C8A	6800		†RCW-3104	†PA-248	D6-682	TP66	GP2-333-682	UC-5368	5HK-D68	
B	5000				DD-502	K080	GP2-333-502	DC-525	5HK-D5	
C9	.082	200	RCN-079							
C10	.0082	200	RCN-054							
C11	.12	200	RCN-078							
C12	.047	600	RCN-053	489ZX-047	DF-503	PJ4S47		PT414 7	4TM-S47	
C13	.05	400	UCC-045	P488-05	DF-503	CUB4S5		PT445	4TM-S5	

♦ Items C7A, C7B, C7C, C7D are combined in one unit.
† Items C8A, C8B are combined in one unit.

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: General Electric PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	250KΩ	½	RRC-242			AB-52	U-45	Tone
B	Shaft		Not Req.			AK-4	Not Req.	Attach to R1A
R2	2 Meg	½	RRC-241					Volume & switch tapped @ 1.5 Meg - Note

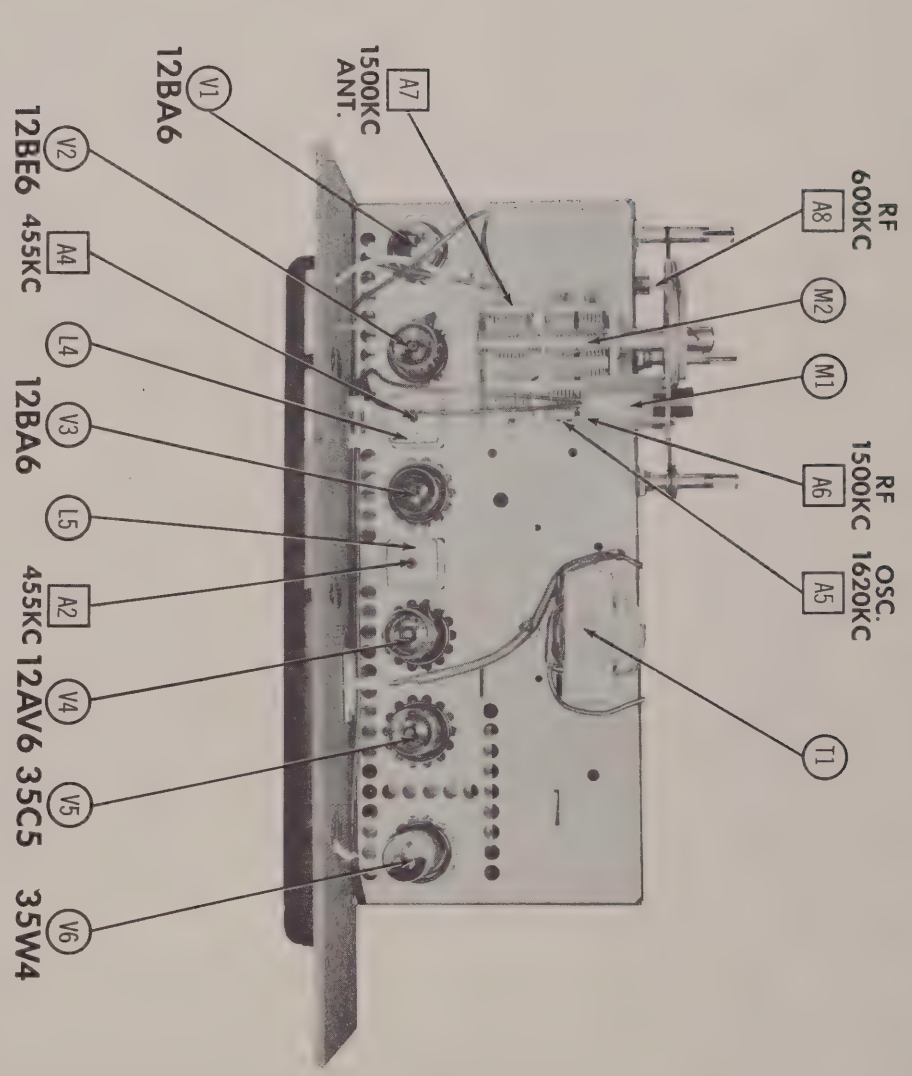
Note -The center position of the switch is off.

RESISTORS

ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: General Electric PART No.	REPLACEMENT DATA: IRC PART No.	NOTES
R3	22Ω	½	URD-009	BTS-22	
R4	22KΩ	½	URD-081	BTS-22K	
R5	100Ω	½	URD-025	BTS-100	
R6	120Ω	½	URD-027	BTS-120	
R7	2.2Meg	½	URD-129	BTS-2.2Meg	
R8	33KΩ	½	URD-085	BTS-33K	
R9	330KΩ	½	URD-109	BTS-330K	
R10	6.8Meg	½	URD-141	BTS-6.8Meg	
R11	470KΩ	½	URD-113	BTS-470K	

ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: General Electric PART No.	REPLACEMENT DATA: IRC PART No.	NOTES
R12	470KΩ	½	URD-113	BTS-470K	
R13	150Ω	½	URD-029	BTS-150	
R14	1000Ω	2	URF-049	BTB-1000	
R15	4700Ω	½	URD-065	BTS-4700	
R16	1800Ω	½	URD-055	BTS-1800	
R17	820Ω	½	URD-047	BTS-820	
R18	18KΩ	½	URD-079	BTS-18K	
R19	18Ω	½	URD-007	BTS-18	

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE PRI.	IMPEDANCE SEC.	REPLACEMENT DATA General Electric PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.	NOTES
T1	2.4KΩ	#1 3.4Ω SEC. 2 61Ω (RES)	RTO-145						

SPEAKER

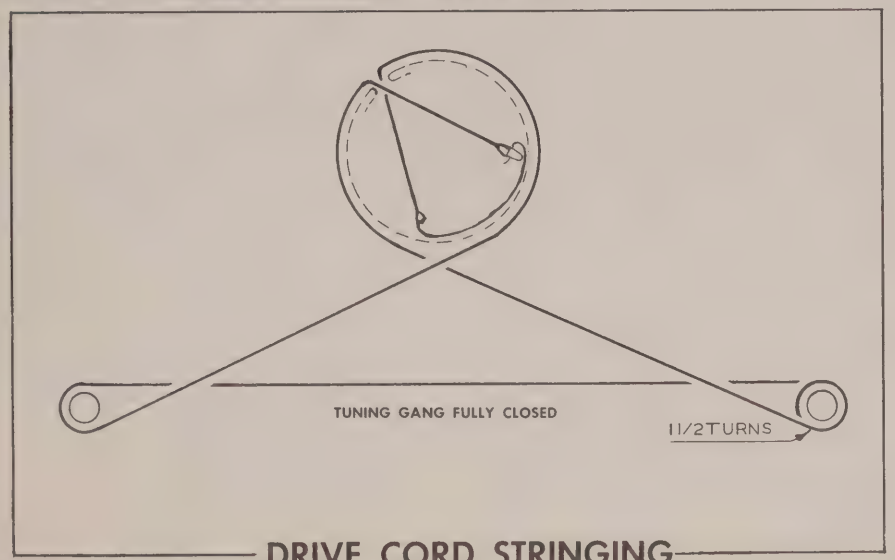
ITEM No.	RATINGS SIZE	FIELD	V. C. IMP.	REPLACEMENT DATA General Electric PART No.	JENSEN PART No.	QUAM PART No.	NOTES
SP1	6"	PM	3.4Ω	S625D7	ST-108 Mod P6-X	6A1	

COILS (RF-IF)

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA General Electric PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	NOTES
L1	Ant. Coil	.5Ω		RLL-055				
L2	RF Coil	35Ω	11Ω	RLB-034				Sec. tapped @ 5.5Ω
L3	Osc. Coil	.5Ω	7.5Ω	RLC-126	14-1074		70-Osc.	
L4	Input IF	14Ω	14Ω	RTL-143	16-6758	BC-352	12-C1	
L5	Output IF	13Ω	13Ω	RTL-143	16-6758	BC-353	12-C2	

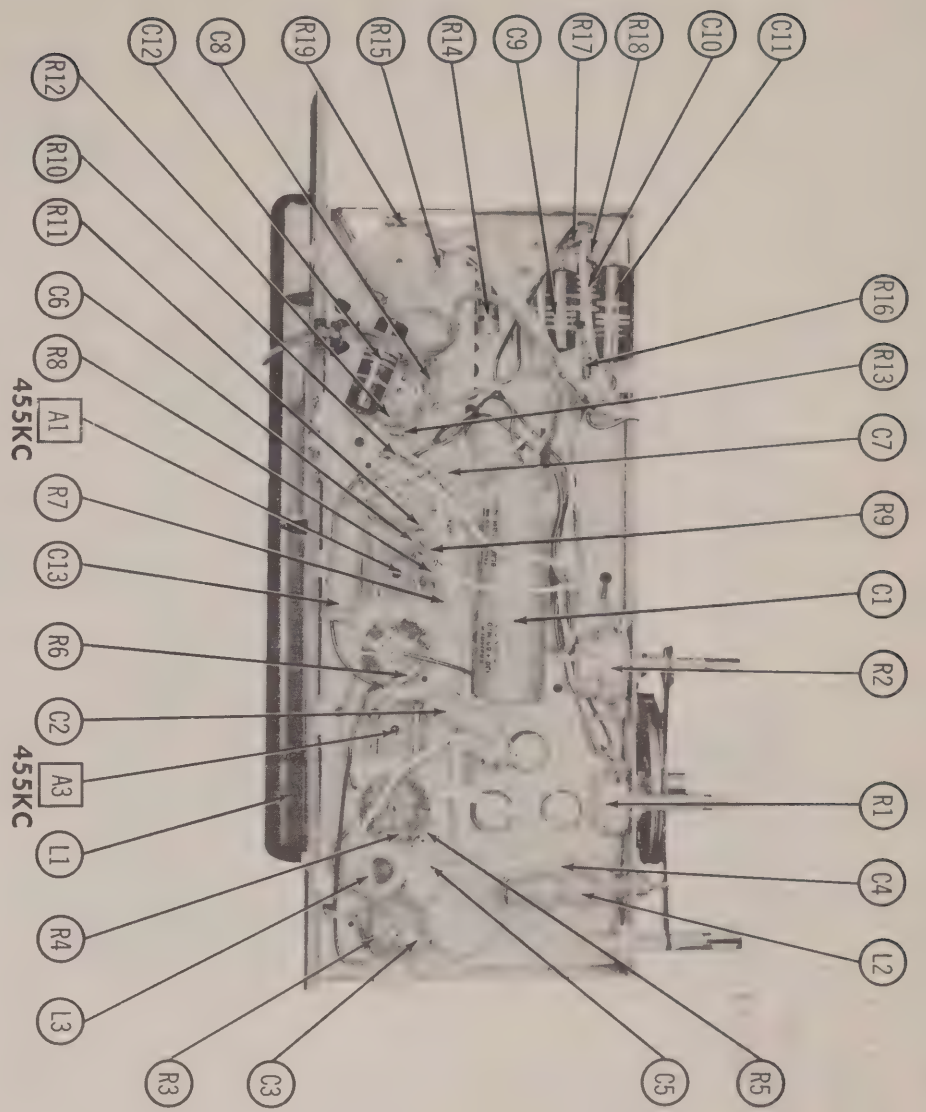
MISCELLANEOUS

ITEM No.	PART NAME	General Electric PART No.	NOTES
M1	Dial light		Type # 44
M2	Tuning cap	RCT-074	(15-310MMF) (11-205MMF) (18-125MMF)
	Cabinet	RAU-392	Dark brown
	Cabinet	RAU-393	Ivory
	Knob	RDK-294	Tone & tuning, fawn
	Knob	RDK-315	Volume (white dot- fawn)

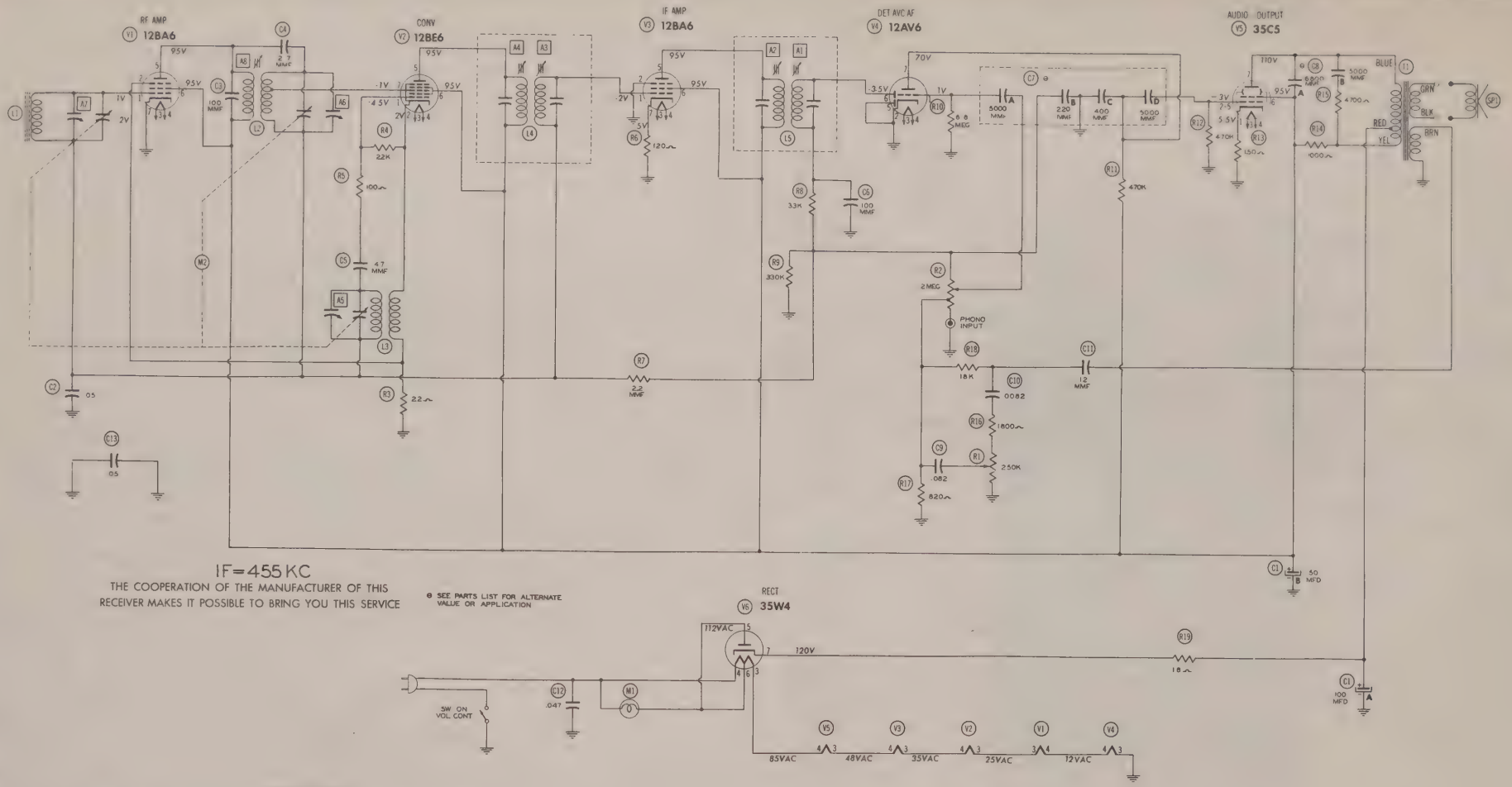


DRIVE CORD STRINGING

CHASSIS—BOTTOM VIEW



GENERAL ELECTRIC MODEL 431



IF=455 KC

THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

⊖ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V 1	12BA6	4.2Meg	22Ω	25Ω	13Ω	†1KΩ	†1KΩ	0Ω
V 2	12BE6	22KΩ	22Ω	25Ω	36Ω	†1KΩ	†1KΩ	4.2Meg
V 3	12BA6	4.2Meg	0Ω	36Ω	47Ω	†1KΩ	†1KΩ	120Ω
V 4	12AV6	6.8Meg	0Ω	0Ω	13Ω	0Ω	2Meg	†470KΩ
V 5	35C5	150Ω	470KΩ	47Ω	85Ω	470KΩ	†1KΩ	†290Ω
V 6	35W4	†28Ω	†1KΩ	85Ω	118Ω	115Ω	115Ω	100KΩ

† MEASURED FROM PIN 7 OF V6

1. DC voltage measurements taken with vacuum tube voltmeter, AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

PHOTOFACT STANDARD NOTATION SCHEMATIC

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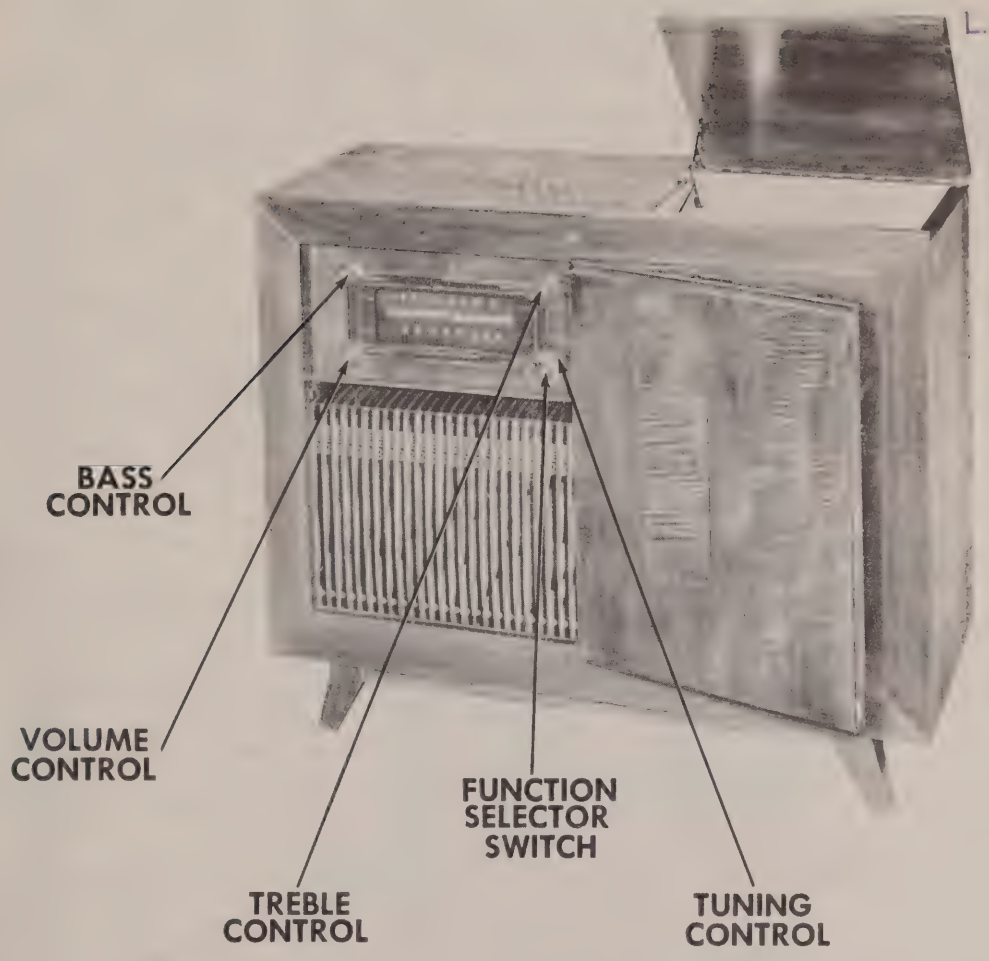
PHILCO MODEL B1756

PROPERTY OF
L. F. [illegible]
3924 [illegible] ST
DENVER, COLORADO

PHILCO MODEL B1756



PHILCO MODEL B1756

TRADE NAME	Philco Model B1756	
MANUFACTURER	Philco Corp., Tioga & "C" Sts., Philadelphia, Pa.	
TYPE SET	AC Operated AM-FM-Phono Combination Superheterodyne Receiver with 3 Speed Automatic Record Changer	
TUBES	Fourteen	
POWER SUPPLY	105-120 Volts AC-60 Cycles	RATING 1.17 Amp. @ 117 Volts AC
TUNING RANGE -BROADCAST	540-1620KC	FREQ. MOD. 88-108MC

RECORD CHANGER UNIT - PHILCO TYPE M-25

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

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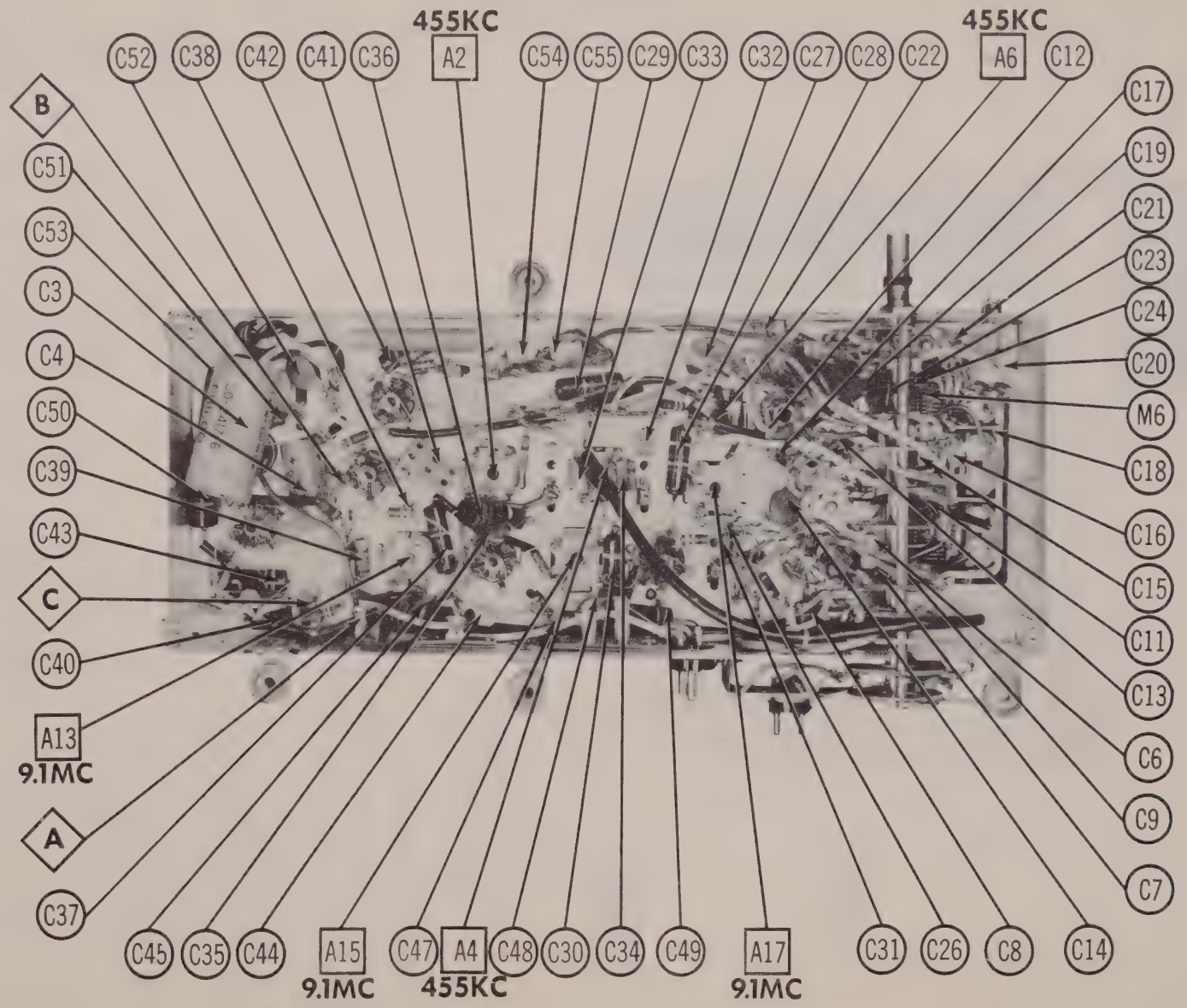
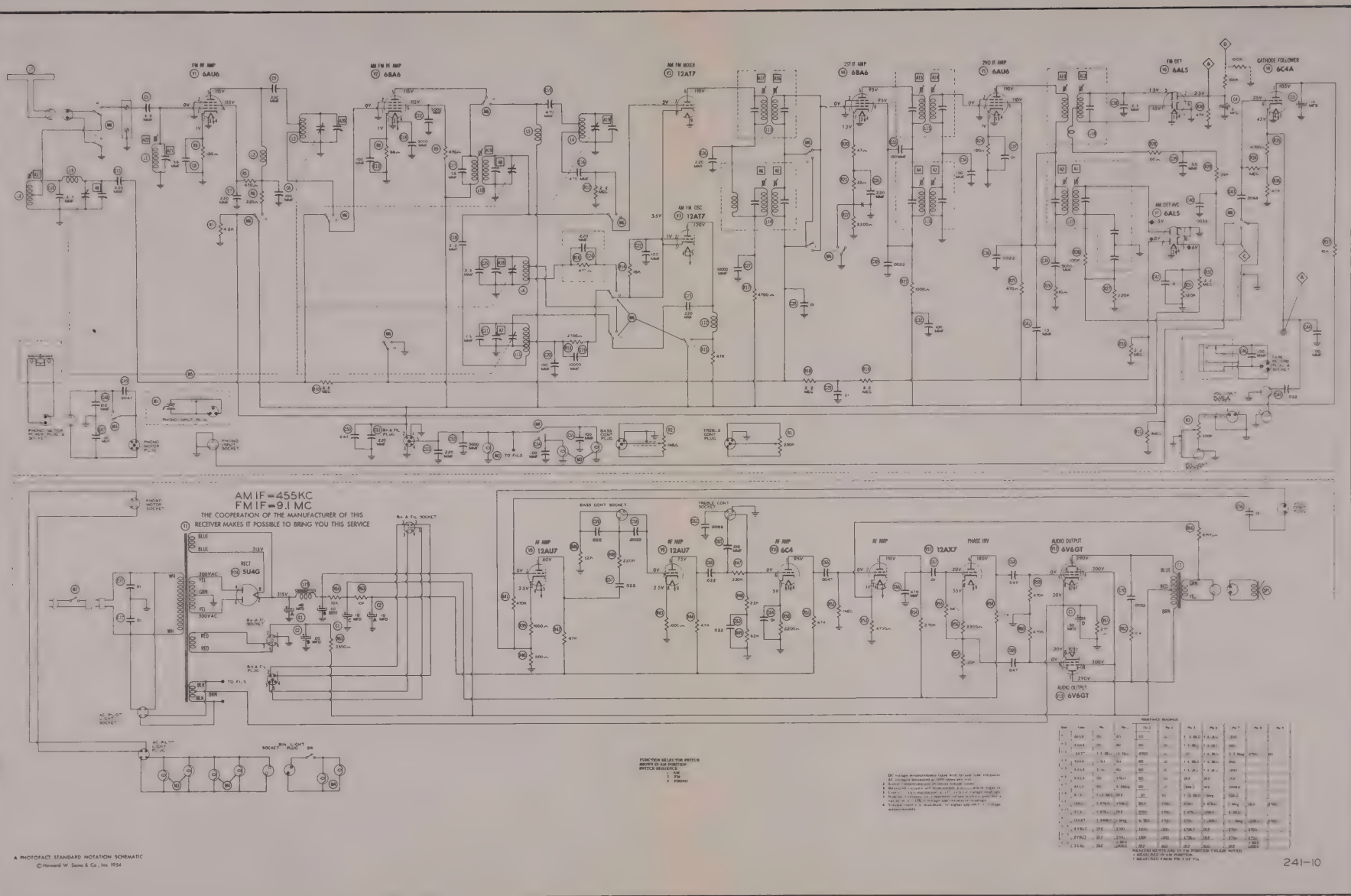


RF-IF CHASSIS-BOTTOM VIEW-CAPACITOR IDENTIFICATION



A PHOTOFACT STANDARD NOTATION SCHEMATIC

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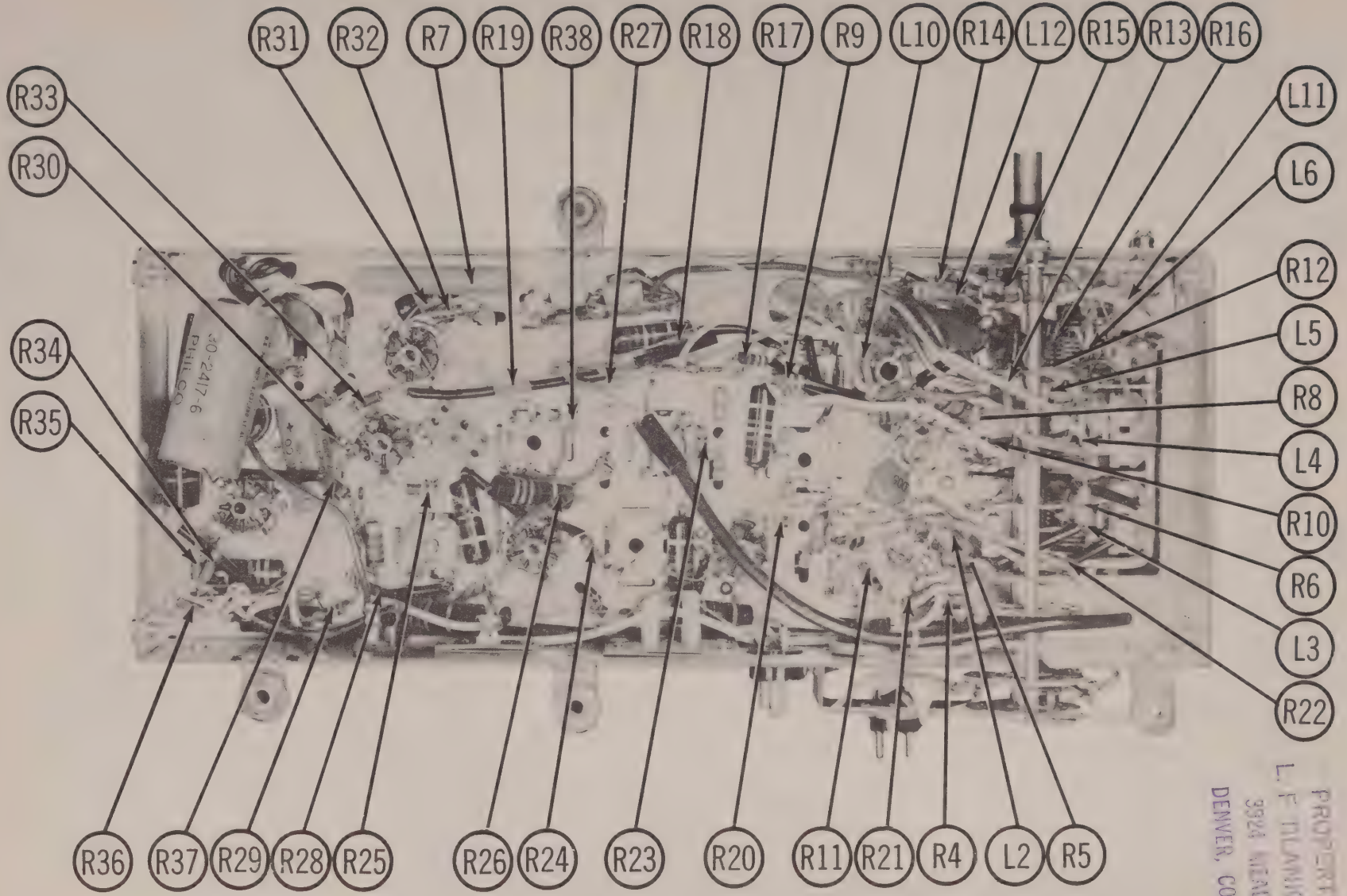


RF-IF CHASSIS-BOTTOM VIEW-RESISTOR IDENTIFICATION

PROPERTY OF
L. F. HANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Allow a 15 minute warm-up period for receiver and test equipment.
With tuning gang fully closed set pointer to the left hand edge of bass note #10. Use this point as the index mark.
Use loop antenna attached to cabinet or its equivalent.
Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

AM ALIGNMENT

Attenuate generator output to maintain not more than 0.15 volts on output meter.
Using the index mark (see pre-alignment instructions) as a reference, set the pointer 6 1/16" from index mark for 1620KC, 5 10/16" for 1500KC, and 11/16" for 580KC.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.05MFD	High side to pin 1 (grid) of 6AU6 (V5). Low side to chassis.	455KC (400∿Mod)	AM	Tuning gang fully open	Point Ⓐ to chassis.	A1, A2	Adjust for maximum output.
2.	"	High side to pin 1 (grid) of 6BA6 (V4). Low side to chassis.	"	"	"	"	A3, A4	Connect 1KΩ resistor across primary and adjust A3 for maximum output. Reconnect the 1KΩ resistor across secondary and adjust A4 for maximum output.
3.	"	High side to terminal 4 of L10. Low side to chassis.	"	"	"	"	A5, A6	Connect the 1KΩ resistor (used in step 2) across primary and adjust A5 for maximum output. Reconnect the 1KΩ resistor across secondary and adjust A6 for maximum output. Remove the 1KΩ resistor. Rock generator thru 450 to 460KC and note deflection on output meter. If equal peaks do not occur at 452 and 458KC, SLIGHTLY retouch A4. If symmetry cannot be obtained by adjustment of A4 repeat steps 1, 2 and 3
4.		Loop	1620KC	"	1620KC	"	A7	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
5.		"	1500KC	"	Tune to 1500KC signal	"	A8, A9	"
6.		"	580KC	"	Tune to 580KC signal	"	A10, A11	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output. Repeat steps 5 and 6 until maximum improvement is obtained.

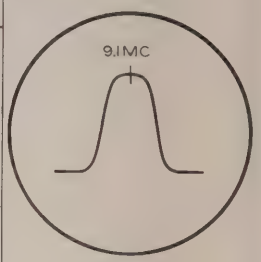


FIG. 1

FM IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

Connect two matched 100KΩ (±1%) resistor in series from point Ⓑ to chassis. The junction of these two resistors is alignment point Ⓓ as shown on the schematic.
Attenuate generator output to maintain 5 to 10 volts at VTVM in all steps except step 7.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
7.	.05MFD	High side to pin 1 (grid) of 6AU6 (V5). Low side to chassis.	9.1MC (400∿Mod)	FM	Tuning gang fully closed	DC probe to point Ⓒ. Common to point D.	A12	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.
8.	"	"	"	"	"	DC probe to point Ⓑ. Common to chassis.	A13	Adjust for maximum deflection.
9.	"	High side to pin 1 (grid) of 6BA6 (V4). Low side to chassis.	"	"	"	"	A14, A15	"
10.	"	High side to pin 1 of L4. Low side to chassis.	"	"	"	"	A16, A17	"

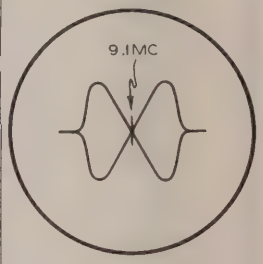


FIG. 2

FM IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

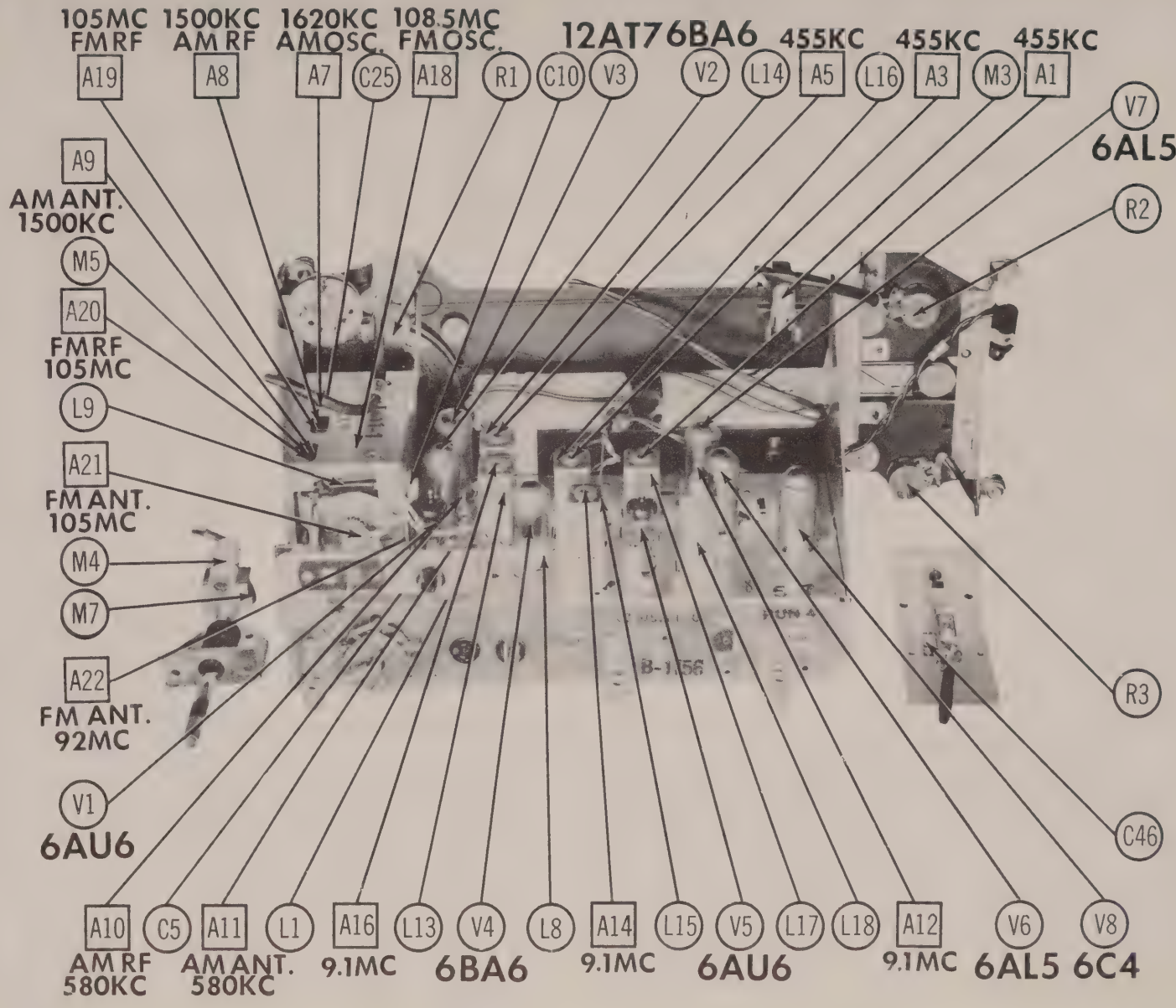
Use frequency modulated signal with 60∿ modulation and 450KC sweep. Use 120∿ sawtooth voltage in scope for horizontal deflection.
Use only enough generator output to obtain usable pattern on scope.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT SCOPE	ADJUST	REMARKS
7.	.01MFD	High side to pin 1(grid) of 6AU6 (V5). Low side to chassis.	9.1MC (450KC Swp)	FM	Tuning gang fully closed	Vert. Amp. to point Ⓒ. Low side to chassis.	A12 A13	Adjust A12 so that 9.1MC occurs at center of crossover lines as in Fig. 2. Adjust A13 for maximum amplitude and straightness of crossover lines.
8.	"	High side to pin 1 (grid) of 6BA6 (V4). Low side to chassis.	"	"	"	Vert. Amp. to point Ⓑ. Low side to chassis.	A14 A15	Disconnect stabilizing capacitor C4. Adjust for curve of maximum amplitude and symmetry similar to Fig. 1
9.	"	High side to pin 1 of L4. Low side to chassis.	"	"	"	"	A16 A17	Disconnect stabilizing capacitor C4. Adjust for curve of maximum amplitude and symmetry similar to Fig. 1. Continue alignment with step 11.

FM RF ALIGNMENT

Using the index mark (see pre-alignment instructions) as a reference set the pointer 6 1/4" from index mark for 108.5MC, 4" for 105MC, 1 1/16" for 92MC and 3/16" for 88MC.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
11.		Loop	108.5MC	FM	108.5MC	DC probe to point Ⓑ. Common to chassis.	A18	Adjust for maximum deflection.
12.		"	88MC	"	88MC	"		Insert iron end of tuning wand in L6. If deflection increases compress coil, L6, SLIGHTLY. Insert brass end of wand in L6. If deflection increases expand coil, L6, SLIGHTLY. Repeat steps 11 and 12 until correct oscillator tracking is obtained.
13.		"	105MC	"	105MC	"	A19, A20 A21	Adjust in order given for maximum deflection.
14.		"	92MC	"	92MC	"	A22	Adjust L4 and L3 by compressing or expanding coil. Use tuning wand as outlined in step 12. Adjust A22 for maximum deflection. Repeat steps 13 and 14 until correct RF tracking is obtained.



RF-IF CHASSIS-TOP VIEW

PROPERTY OF
L. F. BLANKENSHIP
MEADE ST.
DENVER, COLORADO

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA: PHILCO PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RETMA BASE TYPE	NOTES
V1	FM RF Amplifier	6AU6	6AU6	7BK	
V2	AM-FM RF Amp.	6BA6	6BA6	7BK	
V3	AM-FM Mixer - Osc.	12AT7	12AT7	9A	
V4	1st. IF Amp.	6BA6	6BA6	7BK	
V5	2nd. IF Amp.	6AU6	6AU6	7BK	
V6	FM Detector	6AL5	6AL5	6BT	
V7	AM Det.-AVC	6AL5	6AL5	6BT	
V8	Cathode Follower	6C4A	6C4A	6BG	
V9	AF Amplifier	12AU7	12AU7	9A	
V10	AF Amplifier	6C4	6C4	6BG	
V11	AF Amplifier-Phase Inverter	12AX7	12AX7	9A	
V12	Audio Output	6V6GT	6V6GT	7S	
V13	Audio Output	6V6GT	6V6GT	7S	
V14	Rectifier	5U4G	5U4G	5T	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: PHILCO PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C1A	▲40	450	30-2584-36	AFH4-87		D065			TVL-4745	
B	■30	450								
C	▲10	450								
D	50	50								
C2A	10	450	30-2417-39	PRS450/10		BR1045		TC72	TVA-1705	Red
B	20	450		PRS450/20		BR2045		TC75	TVA-1709	Orange
C3	10	450	45-3035-39	PRS450/10		BR1045		TC72	TVA-1705	
C4	2	50	4503035-4	E26E6		BBR2-50		TC302	TVA-1301	
C5	3.3		30-1224-103	SI3.3NP0	TCZ-3.3	TZ06	NP0K-3R3	ZT-5533	5TCCB-V33	
C6	100		62-110009001	SI100	D6-101	TP34	GP1K-101	UC-531	5GA-T1	
C7	220		62-122001001	SI220	D6-221	TP39	GP2K-221	UC-5322	5GA-T22	
C8	56		62-056409001	SI56	D6-560	TP31	GP1K-560	UC-5456	5GA-Q56	
C9	220		62-122001001	SI220	D6-221	TP39	GP2K-221	UC-5322	5GA-T22	
C10	3.3		30-1224-103	SI3.3NP0	TCZ-3.3	TZ06	NP0K-3R3	ZT-5533	5TCCB-V33	
C11	220		62-122001001	SI220	D6-221	TP39	GP2K-221	UC-5322	5GA-T22	
C12	5000		30-1238-1	BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C13	100		62-110001021	SI100	D6-101	TP34	GP1K-101	UC-531	5GA-T1	
C14	5000		30-1238-1	BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C15	470		62-147001021	SI470	D6-471	TP46	GP2K-471	UC-5347	5GA-T47	
C16	470		62-147001021	SI470	D6-471	TP46	GP2K-471	UC-5347	5GA-T47	
C17	56		62-056409001	SI56	D6-560	TP31	GP1K-560	UC-5456	5GA-Q56	
C18	2.2		30-1221-4	SI2.2NP0	TCZ-2.2	TZ05	NP0K-2R2	ZT-5522	5TCCB-V22	
C19	10000		30-1238-2	BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C20	100		62-110009001	SI100	D6-101	TP34	GP1K-101	UC-531	5GA-T1	
C21	7.5		30-1224-65							
C22	100		62-110001021	SI100	D6-101	TP34	GP1K-101	UC-531	5GA-T1	
C23	220		62-122001001	SI220	D6-221	TP39	GP2K-221	UC-5322	5GA-T22	Note 1
C24	220		†30-6002	†PA-229-2	D6-221	TP39	GP2K-221	UC-5322	5GA-T22	
C25	3.3		30-1224-49	SI3.3NP0	TCZ-3.3	TZ06	NP0K-3R3	ZT-5533	5TCCB-V33	Note 2
C26	220		62-122001001	SI220	D6-221	TP39	GP2K-221	UC-5322	5GA-T22	
C27	10000		30-1238-2	BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C28	.01	400	30-4650-58	P488-01	D6-103	CUB4S1	GP2-333-103	PT411	4TM-S1	
C29	.01	400	30-4650-58	P488-01	D6-103	CUB4S1	GP2-333-103	PT411	4TM-S1	
C30	.0022	400	30-4650-54	P688-0022	D6-222	CUB6D22	GP2-333-222	PT6222	6TM-D22	
C31	220		62-122001001	SI220	D6-221	TP39	GP2K-221	UC-5322	5GA-T22	
C32	100		62-110001021	SI100	D6-101	TP34	GP1K-101	UC-531	5GA-T1	
C33	150	500	60-10155417	1469-00015		22R5T15		MCB236		
C34	150	500	60-10155417	1469-00015		22R5T15		MCB236		
C35	5000		30-1238-1	BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C36	.0022	400	30-4650-54	P688-0022	D6-222	CUB6D22	GP2-333-222	PT6222	6TM-D22	
C37	.01	400	30-4650-58	P488-01	D6-103	CUB4S1	GP2-333-103	PT411	4TM-S1	
C38	3.3		30-1224-103	SI3.3NP0	TCZ-3.3	TZ06	NP0K-3R3	ZT-5533	5TCCB-V33	
C39	150		62-115001011	SI150	D6-151	TP36	GP2K-151	UC-5315	5GA-T15	
C40	.0033	400	30-4650-55	P688-0033	D6-332	PJ6D33	GP2L-332		6TM-D33	
C41	15	500	60-00155417			22R5Q15			MS-415	
C42	.01	400	30-4650-58	P488-01	D6-103	CUB4S1	GP3-333-103	PT411	4TM-S1	

PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS (cont)

ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: PHILCO PART No.	REPLACEMENT DATA: IRC PART No.	NOTES
R40	1000Ω	1/2	66-2108340	BTS-1000	
R41	470KΩ	1/2	66-4478340	BTS-470K	
R42	47KΩ	1/2	66-3478340	BTS-47K	
R43	1000Ω	1/2	66-2108340	BTS-1000	
R44	47KΩ	1/2	66-3478340	BTS-47K	
R45	22KΩ	1/2	66-3228340	BTS-22K	
R46	220KΩ	1/2	66-4228340	BTS-220K	
R47	220KΩ	1/2	66-4228340	BTS-220K	
R48	22KΩ	1/2	66-3228340	BTS-22K	
R49	82KΩ	1/2	66-3828340	BTS-82K	
R50	2200Ω	1/2	66-2228340	BTS-2200	
R51	47KΩ	1/2	66-3478340	BTS-47K	
R52	1 Meg	1/2	66-5108340	BTS-1 Meg	
R53	4700Ω	1/2	66-2478340	BTS-4700	

ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: PHILCO PART No.	REPLACEMENT DATA: IRC PART No.	NOTES
R54	270KΩ	1/2	66-4278340	BTS-270K	
R55	1 Meg	1/2	66-5108340	BTS-1 Meg	
R56	3300Ω	1/2	66-2338340	BTS-3300	
R57	120KΩ	1/2	66-4128340	BTS-120K	
R58	120KΩ	1/2	66-4128340	BTS-120K	
R59	470KΩ	1/2	66-4478340	BTS-470K	
R60	470KΩ	1/2	66-4478340	BTS-470K	
R61	270Ω	7	33-1335-91		
R62	10KΩ	2	66-3105340	BTB-10K	
R63	10KΩ	1/2	66-3108340	BTS-10K	
R64	10K Ω	1	66-3104340	BTA-10K	
R65	3500Ω	15	33-3446-12		
R66	6800Ω	1/2		BTS-6800	

† Items R16, C24 are combined in one unit.

TRANSFORMER (POWER)

ITEM No.	RATING: PRI.	RATING: SEC. 1	RATING: SEC. 2	RATING: SEC. 3	REPLACEMENT DATA: PHILCO PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.
T1	117VAC @ 1.17A	520VCT .130ADC	5VAC @ 3A	6.3VCT @ 2.26A SEC. 4 6.3VAC @ 2.9A	32-8638					

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE: PRI.	IMPEDANCE: SEC.	REPLACEMENT DATA: PHILCO PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.	NOTES
T2	6.8KΩ CT	3.3Ω	32-8640	A-3870	A-2901 ①	S-55X	Z1011	TS-24S60 ①	① Drill one new mounting hole.

SPEAKER

ITEM No.	RATINGS: SIZE	RATINGS: FIELD	RATINGS: V. C. IMP.	REPLACEMENT DATA: PHILCO PART No.	VIKING PART No.	QUAM PART No.	NOTES
SP1	10"	PM	3.3Ω	36-1653	10J11	10A6A	

COILS (RF-IF)

ITEM No.	USE	DC RES.: PRI.	DC RES.: SEC.	REPLACEMENT DATA: PHILCO PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	NOTES
L1	FM Ant. Coil	0Ω		32-4532A				
L2	FM RF Choke	3Ω		32-4422-10	19-1003		4608	3.3 Microhenries; IRC Part # CLA
L3	1st FM RF Coil	0Ω(tapped)		32-4415-5				
L4	2nd FM RF Coil	0Ω (tapped)		32-4415-4				
L5	FM RF Choke	3Ω		32-4422-10	19-1003		4608	3.3 Microhenries; IRC Part # CLA
L6	FM Osc. Coil	0Ω (tapped)		32-4414-6				
L7	AM Loop Ant.							Consists of one loop of # 14 stranded wire attached to back of cabinet
L8	AM Ant. Coil	4.2Ω		32-4605				Tapped @ .3Ω
L9	AM Loading coil	.4Ω		32-4061-3	19-1003		4608	4.1 Microhenries
L10	AM RF Coil	90Ω	8Ω	32-4572	14-1072	BC-382	70-RF	
L11	AM Osc. Coil	9.5Ω		32-4569-2			71-Osc.	Tapped @ 5.5Ω & @ 6.5Ω
L12	RF Choke	3Ω		32-4422-10	19-1003		4608	3.3 Microhenries; IRC Part # CLA

PARTS LIST AND DESCRIPTIONS (Continued)

CAPACITORS (cont)

ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA PHILCO PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C43	.0068	400	30-4650-57	P488-0068	D6-682	CUB6D68	GP2-333-682		6TM-D68	
C44	100		62-110001021	SI100	D6-101	TP34	GP1K-101	UC-531	5GA-T1	
C45	.022	400	30-4650-60	P488-022		CUB4S22		PT4122	4TM-S22	
C46	100		62-110001021	SI100	D6-101	TP34	GP1K-101	UC-531	5GA-T1	
C47	100		62-110001021	SI100	D6-101	TP34	GP1K-101	UC-531	5GA-T1	
C48	100		62-110001021	SI100	D6-101	TP34	GP1K-101	UC-531	5GA-T1	
C49	.0047	600	30-4650-56	P688-0047	D6-472	CUB6D47	GP2L-472	PT6247	6TM-D47	
C50	.047	400	30-4650-62	P488-047	DF-503	CUB4S47		PT4147	4TM-S47	
C51	220		62-122001001	SI220	D6-221	TP39	GP2K-221	UC-5322	5GA-T22	
C52	5000		30-1238-1	BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C53	220		62-122001001	SI220	D6-221	TP39	GP2K-221	UC-5322	5GA-T22	
C54	100		62-110001021	SI100	D6-101	TP34	GP1K-101	UC-531	5GA-T1	
C55	100		62-110001021	SI100	D6-101	TP34	GP1K-101	UC-531	5GA-T1	
C56	.01	400	30-4650-58	P488-01	D6-103	CUB4S1	GP2-333-103	PT411	4TM-S1	
C57	.022	600	30-4650-60	P688-022		CUB6S22		PT6122	6TM-S22	
C58	.0022	400	30-4650-54	P688-0022	D6-222	CUB6D22	GP2-333-222	PT6222	6TM-D22	
C59	.022	400	30-4650-60	P488-022		CUB4S22		PT4122	4TM-S22	
C60	.022	600	30-4650-60	P688-022		CUB6S22		PT6122	6TM-S22	
C61	510	500	60-10515337			5R5T51				
C62	.0068	400	30-4650-57	P488-0068	D6-682	CUB6D68	GP2-333-682		6TM-D68	
C63	.022	400	30-4650-60	P488-022		CUB4S22		PT4122	4TM-S22	
C64	.01	400	30-4650-58	P488-01	D6-103	CUB4S1	GP3-333-103	PT411	4TM-S1	
C65	.0047	600	30-4650-56	P688-0047	D6-472	CUB6D47	GP2L-472	PT6247	6TM-D47	
C66	470		62-147001021	SI470	D6-471	TP46	GP2K-471	UC-5347	5GA-T47	
C67	.01	600	30-4650-58	P688-01	D6-103	CUB6S1	GP3-333-103	PT611	6TM-S1	
C68	.047	600	30-4650-62	P688-047	DF-503	CUB6S47		PT6147	6TM-S47	
C69	.047	600	30-4650-62	P688-047	DF-503	CUB6S47		PT6147	6TM-S47	
C70	.0022	1600	30-4650-122	P1688-0022		CUB16D22		PT16222	MB-D22	
C71	.01	400	30-4650-58	489ZX-01	D6-103	CUB4S1	GP3-333-103	PT411	4TM-S1	
C72	.01	400	30-4650-58	489ZX-01	D6-103	CUB4S1	GP3-333-103	PT411	4TM-S1	

† Items C24 and R16 are combined in one unit.
Note 1. Run 5 chassis use 100MMF in this application (part #62-110009021).
Note 2. Run 5 chassis use 5MMF in this application (part #30-1224-35).

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA PHILCO PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	250KΩ	½	33-5565-66	Q13-130	A47-250K-Z	B-51	U-44	Treble
B	Shaft		Not Req.	Not Req.	FS-3	Not Req.	Not Req.	Attach to R1A
R2	1 Meg	½	33-5565-67	Q14-137		B-68		Bass
R3A	100KΩ	½	33-5565-68	Q13-128	A47-100K-Z	B-41	U-39	Volume-See Note
B	Shaft		Not Req.	Not Req.	FS-3	Not Req.	Not Req.	Attach to R3A

Note 1. Some models may use a alternate control Part # 33-5565-74.

RESISTORS

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA PHILCO PART No.	IRC PART No.	NOTES
R4	120Ω	½	66-1128340	BTS-120	
R5	470Ω	½	66-1478340	BTS-470	
R6	220Ω	½	66-1228340	BTS-220	
R7	4200Ω	5	33-1335-101		
R8	68Ω	½	66-0688340	BTS-68	
R9	470Ω	½	66-1478340	BTS-470	
R10	2.2Meg	½	66-5228340	BTS-2.2Meg	
R11	1 Meg	½	66-5108340	BTS-1 Meg	
R12	2.2 Meg	½	66-5228340	BTS-2.2Meg	
R13	2700Ω	½	66-2278340	BTS-2700	
R14	15KΩ	½	66-3158340	BTS-15K	
R15	47KΩ	½	66-3478340	BTS-47K	
R16	470Ω	½	† 30-6002	BTS-470	
R17	4700Ω	½	66-2478340	BTS-4700	
R18	2.2Meg	½	66-5228340	BTS-2.2Meg	
R19	2.2Meg	½	66-5228340	BTS-2.2Meg	
R20	47Ω	½	66-0478340	BTS-47	
R21	33Ω	½	66-0338340	BTS-33	

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA PHILCO PART No.	IRC PART No.	NOTES
R22	2200Ω	½	66-2228340	BTS-2200	
R23	1000Ω	½	66-2108340	BTS-1000	
R24	120Ω	½	66-1128340	BTS-120	
R25	470Ω	½	66-1478340	BTS-470	
R26	10Ω	½	66-010834	BTS-10	
R27	220KΩ	½	66-3228340	BTS-220K	
R28	100Ω	½	66-1108340	BTS-100	
R29	39KΩ	½	66-3398340	BTS-39K	
R30	47KΩ	½	66-3478340	BTS-47K	
R31	120KΩ	½	66-4128340	BTS-120K	
R32	2.2Meg	½	66-5228340	BTS-2.2Meg	
R33	2.2 Meg	½	66-5228340	BTS-2.2 Meg	
R34	1 Meg	½	66-5108340	BTS-1 Meg	
R35	4700Ω	½	66-2478340	BTS-4700	
R36	47KΩ	½	66-3478340	BTS-47K	
R37	10KΩ	½	66-3108340	BTS-10K	
R38	100KΩ	½	66-4108340	BTS-100K	
R39	1000Ω	½	66-2108340	BTS-1000	

PARTS LIST AND DESCRIPTIONS (Continued)

COILS (cont)

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA PHILCO PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	NOTES
L13	1st FM IF	1.5Ω	1.5Ω	32-4518A				
L14	1st AM IF	18Ω	14Ω	32-4606-1A				Tertiary winding=5Ω
L15	2nd FM IF	2.3Ω	2.3Ω	32-4518-1A				
L16	2nd AM IF	3.3Ω	3.3Ω	32-4601-1A	16-6758	BC-352	12-C1	
L17	3rd AM IF	18Ω	14Ω	32-4607-1A	16-6770	BC-355	12-C6	
L18	Ratio Det.	3.4Ω	.5ΩCT	32-4310-4A				Tertiary winding=.65Ω

FILTER CHOKE

ITEM No.	RATINGS TOTAL DIRECT CURRENT	RATINGS D.C. RESISTANCE	RATINGS INDUCTANCE (0 CURRENT 1000 ∿)	REPLACEMENT DATA PHILCO PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.
L19	.130ADC	110Ω	3.7HY	32-8639	C-2303			C5024	T-20C53

PHONO CARTRIDGE

ITEM No.	REPLACEMENT DATA PHILCO PART No.	ASTATIC PART No. CARTRIDGE	ASTATIC PART No. NEEDLE	SHURE PART No. CARTRIDGE	SHURE PART No. NEEDLE	ELECTRO-VOICE PART No. CARTRIDGE	ELECTRO-VOICE PART No. NEEDLE	REMARKS
M1A	45-9785 Regular							
B	45-9792 Hi-Fi	U-J	U-33					

ASTATIC NEEDLE LISTING SHOWN ABOVE ARE SPECIFIED FOR THE RESPECTIVE REPLACEMENT CARTRIDGE LISTED. FOR ORIGINAL CARTRIDGE NEEDLE REPLACEMENT SEE BELOW.

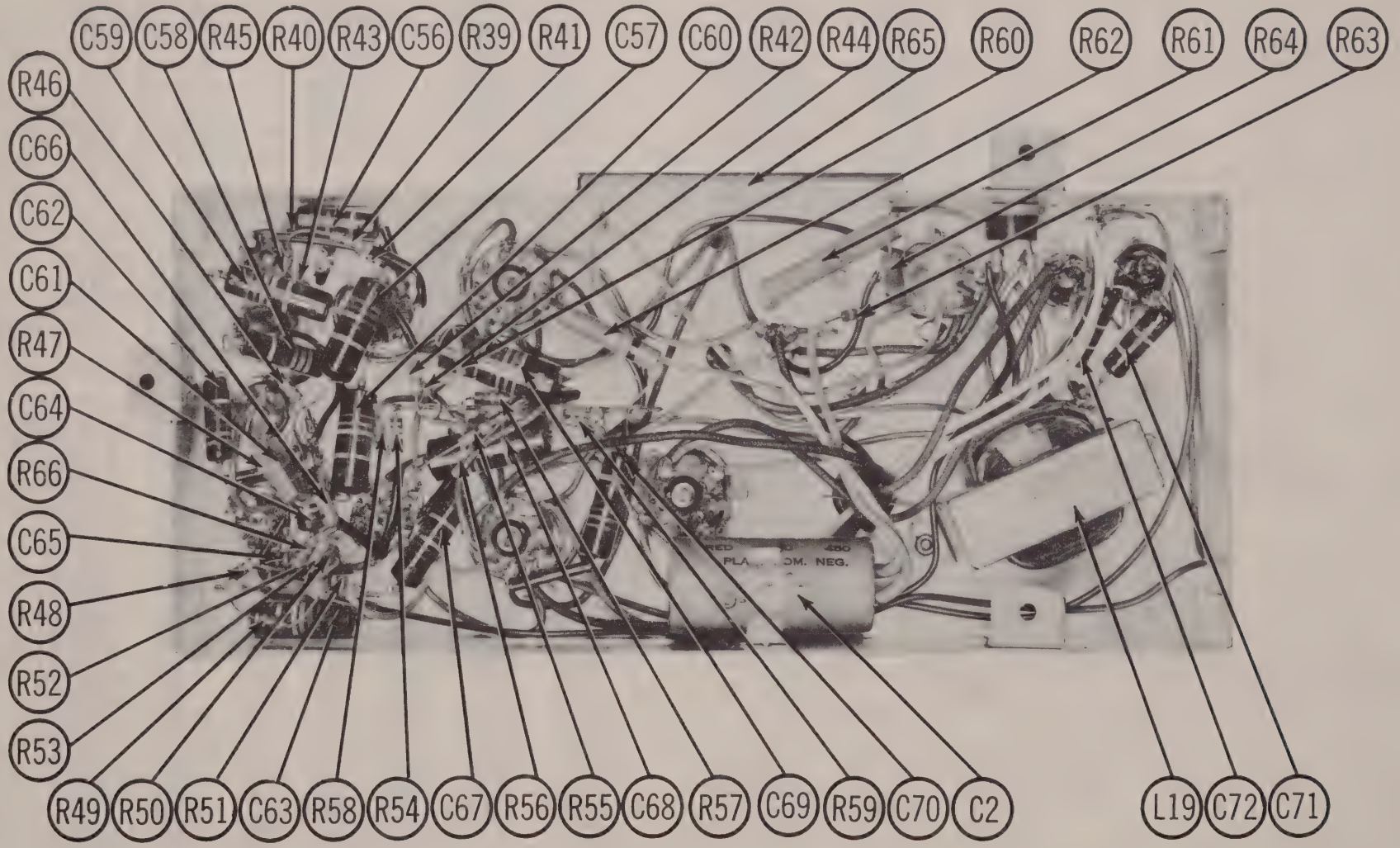
PHONO NEEDLE

(FOR REPLACEMENT IN ORIGINAL EQUIPMENT CARTRIDGE)

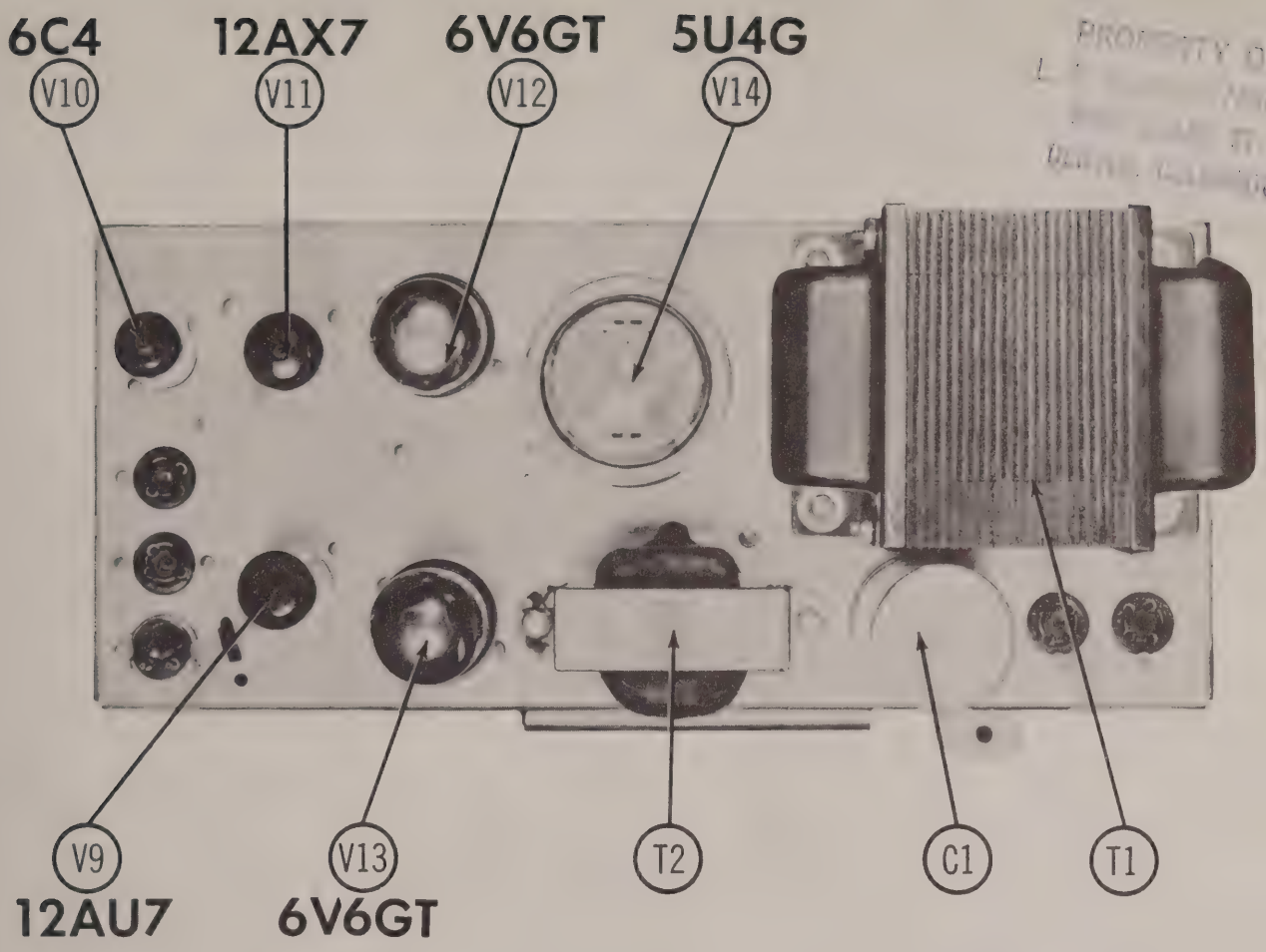
ITEM No.	REPLACEMENT DATA PHILCO PART No.	WALCO PART No.	JENSEN PART No.	REMARKS
M2A	* 45-9784	W 46TPS		* Regular Needle
B	♦ 45-1993	W-47MGS		♦ Hi-Fi Needle

MISCELLANEOUS

ITEM No.	PART NAME	PHILCO PART No.	NOTES
M3	Dial light	34-2064	(5) dial, AM & FM indicators, treble indicator (#44 bayonet)
M4	Dial light	34-2068	(4) power, bass, record changer bin (#47 bayonet)
M5	Tuning cap	31-2773	(18-315 MMF) (14-275MMF) (18-160MMF)
M6	Switch	42-2014	Function selector
M7	Switch	41-4190	Includes power cable Assembly
	Trimmer cap	31-61511-10	FM antenna tuning
	Trimmer cap	31-6524	FM osc. tuning
	Cabinet	11011-1	Light
	Cabinet	11011-3	Mahogany
	Knob	76-8671-1	(3) light
	Knob	78-8672-1	Light-function
	Knob	76-8671	(3) mahogany
	Knob	76-8672	Mahog-function
	Dial scale	54-5194-1	Glass
	Knob	54-6089	Off-on
	Knob	54-6087	Tuning



POWER CHASSIS-BOTTOM VIEW



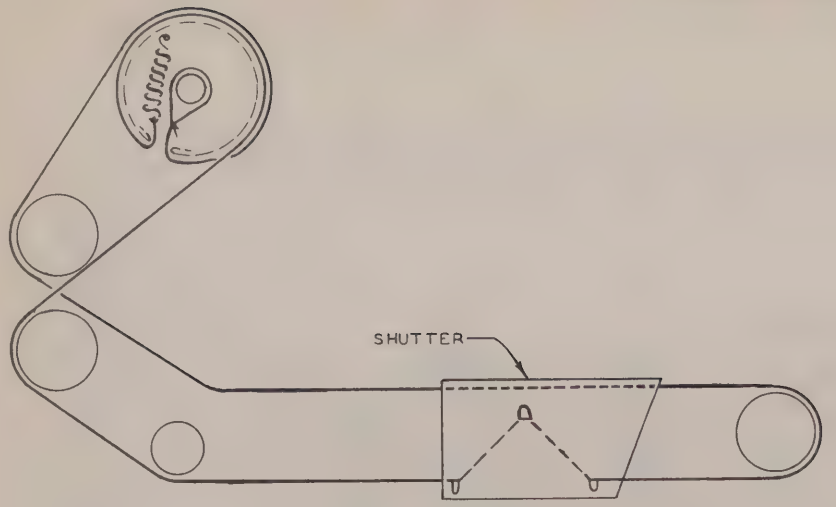
PROPERTY OF

POWER CHASSIS—TOP VIEW

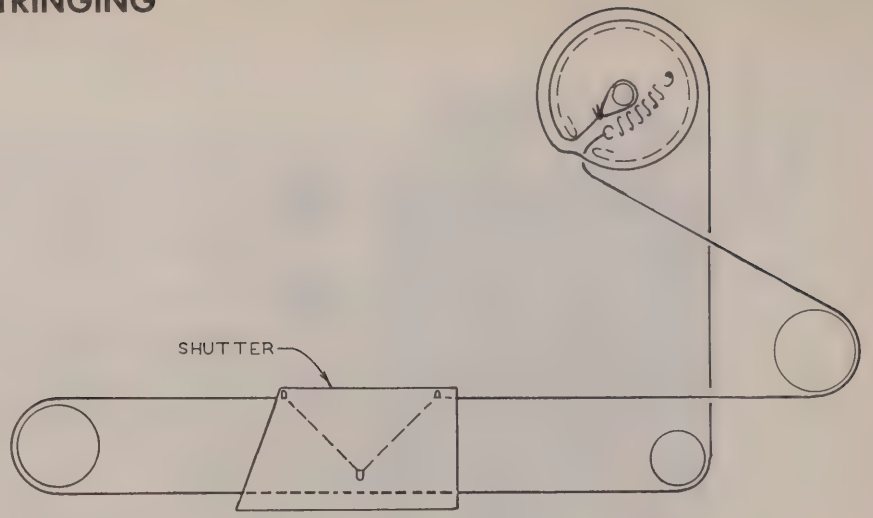
DISASSEMBLY INSTRUCTIONS

1. Remove 5 push-on type control knobs from cabinet front.
2. Remove 15 wood screws and remove rear cover.
3. Remove 6 wood screws and clamp to loosen control cables.
4. Disconnect built-in antenna, 2 inter-chassis cables from chassis PA-1, 2 plugs from treble and bass controls, 1 plug from volume control, speaker plug and AGC plug from power chassis. Remove power chassis.
5. Disconnect phono motor and crystal.
6. Remove 2 wood screws and remove tape recorder input jack.
7. Remove 3 wood screws to remove off/on control from top of chassis.
8. Remove 2 wood screws from dial assembly. Remove chassis.
9. Remove 4 speaker nuts and remove speaker.

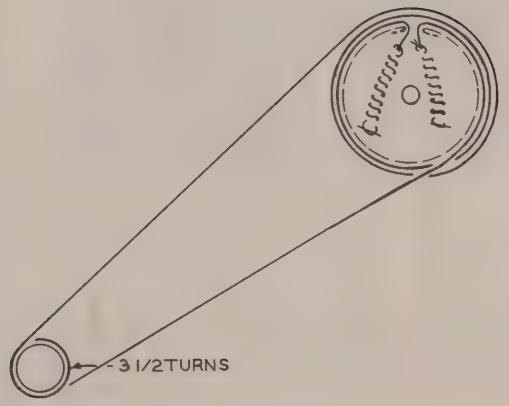
DRIVE CORD STRINGING



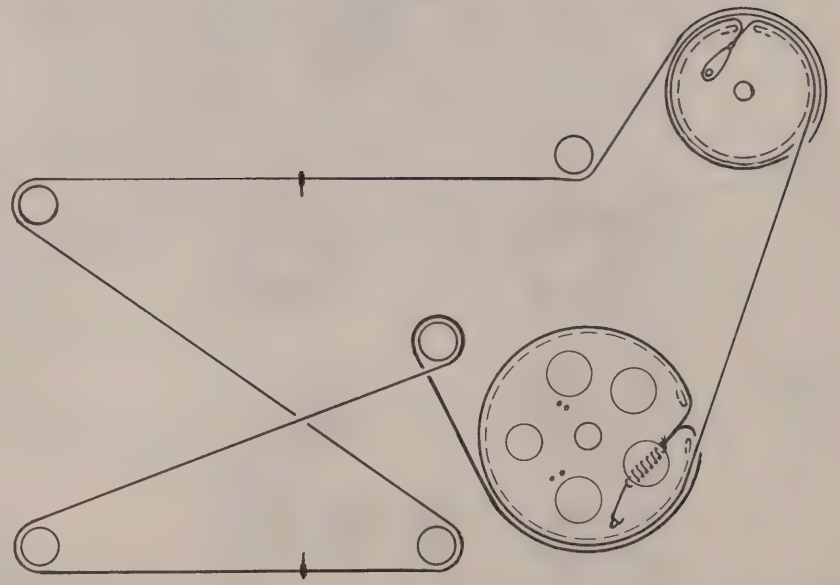
BASS



TREBLE



TUNING



POINTER

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MODEL 22B4008

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RETMA MEMBER

PHILCO MODELS 18B3104, 18BU3104, 22B4008, 22BU4008, 22B4009, 22BU4009, 22B4108, 22BU4108, 22B4110, L, 22BU4110, L, 22B4308, 22BU4308 (Ch. D-201 & R-201) (Code 150)

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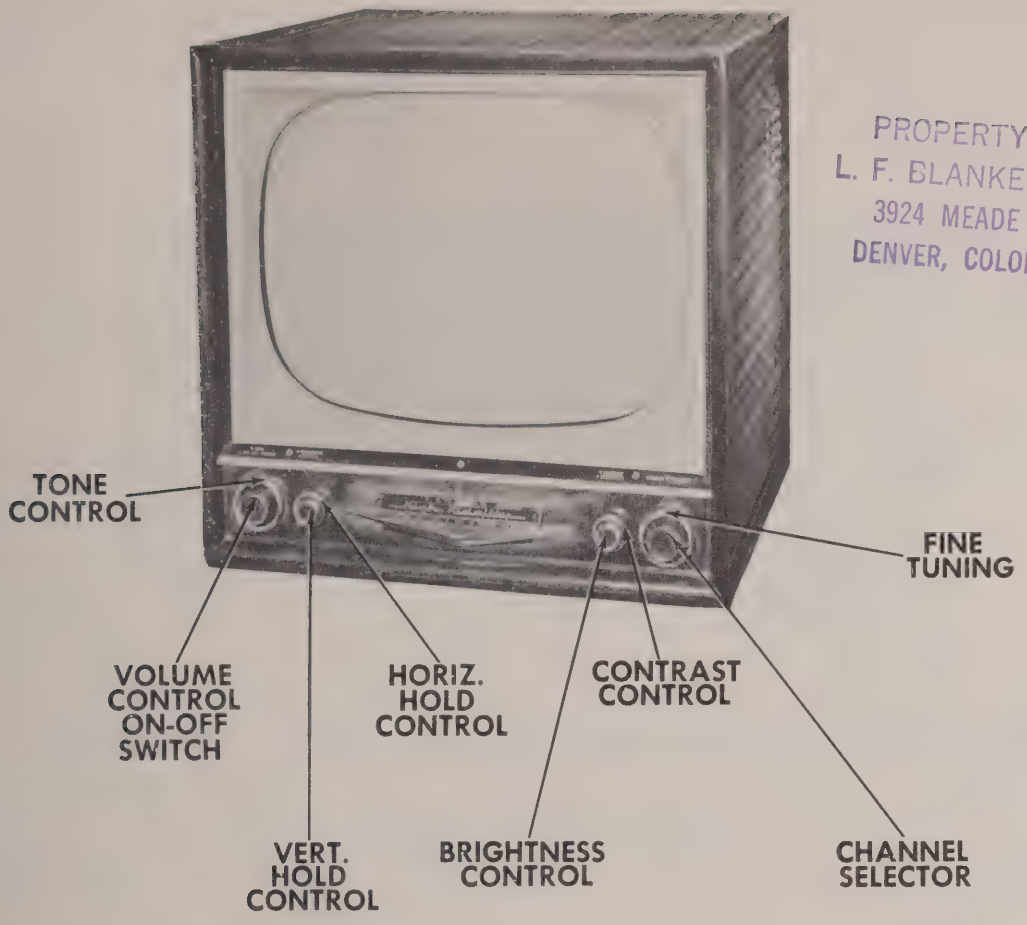

PHILCO MODEL 22B4008

TRADE NAME	Philco	Models 18B3104, 18BU3104, 22B4008, 22BU4008, 22B4009, 22BU4009, 22B4108, 22BU4108, 22B4110, L, 22BU4110, L, 22B4308, 22BU4308 (Deflection Ch. D-201, RF Ch. R-201) Code 150.
MANUFACTURER	Philco Corp., Tioga & "C" Sts., Philadelphia, Pa.	
TYPE SET	Television Receiver	
TUBES	Twenty-two	
POWER SUPPLY	110-120 Volts AC-60 Cycles	RATING 1.42 Amp. @ 117 Volts AC
TUNING RANGE	Channels 2 thru 13 VHF, 14 thru 83 UHF, Video 45.75MC, Sound IF 41.25MC (Intercarrier)	

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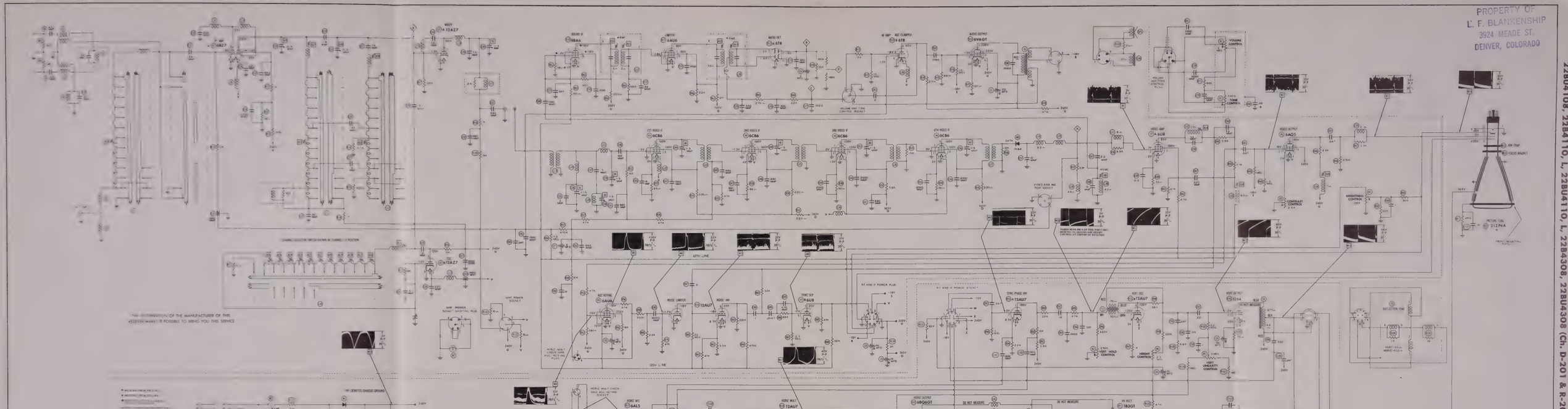

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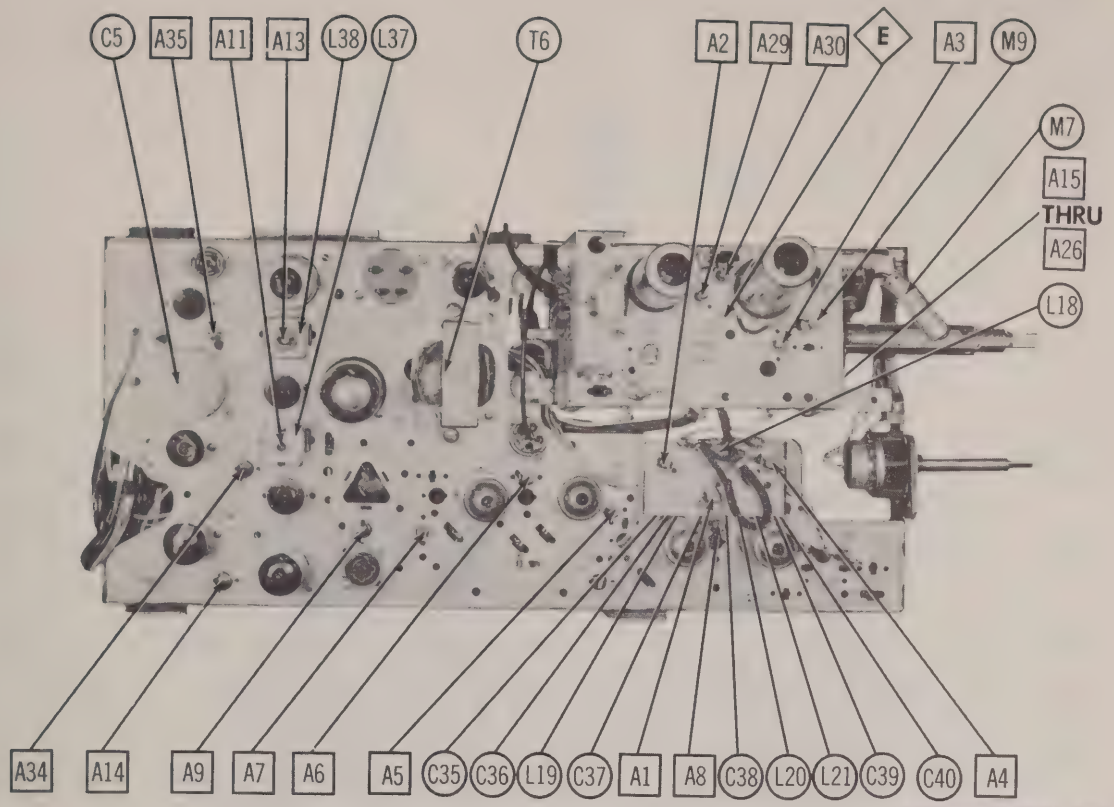
PHILCO MODELS 188J104, 188U3104, 2284008, 228U4008, 2284009, 228U4009, 2284108, 228U4108, 2284110, L, 228U4110, L, 2284308, 228U4308 (Ch. D-201 & R-201) (Code 130)



RF-IF CHASSIS-TOP VIEW

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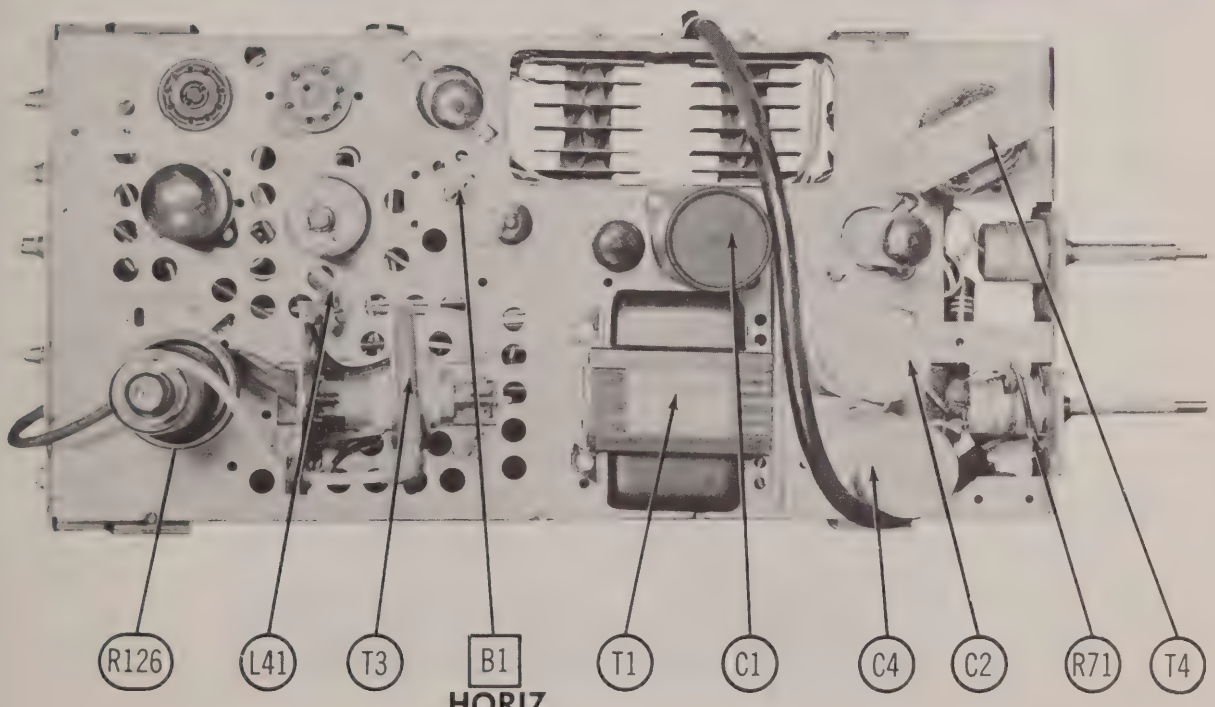
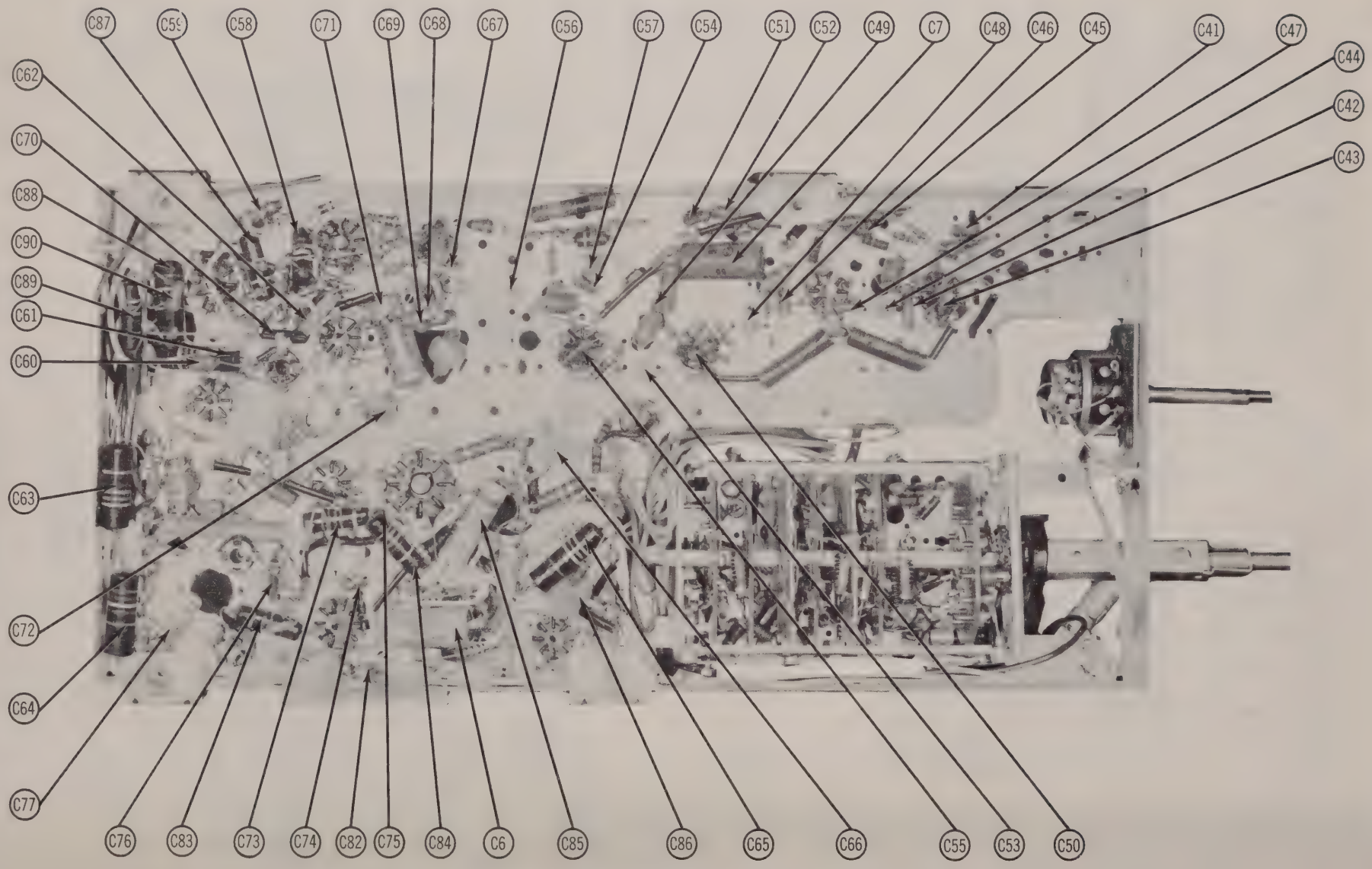


SWEEP CHASSIS-TOP VIEW



RF-IF CHASSIS-BOTTOM VIEW-CAPACITOR IDENTIFICATION

TUBE PLACEMENT CHART

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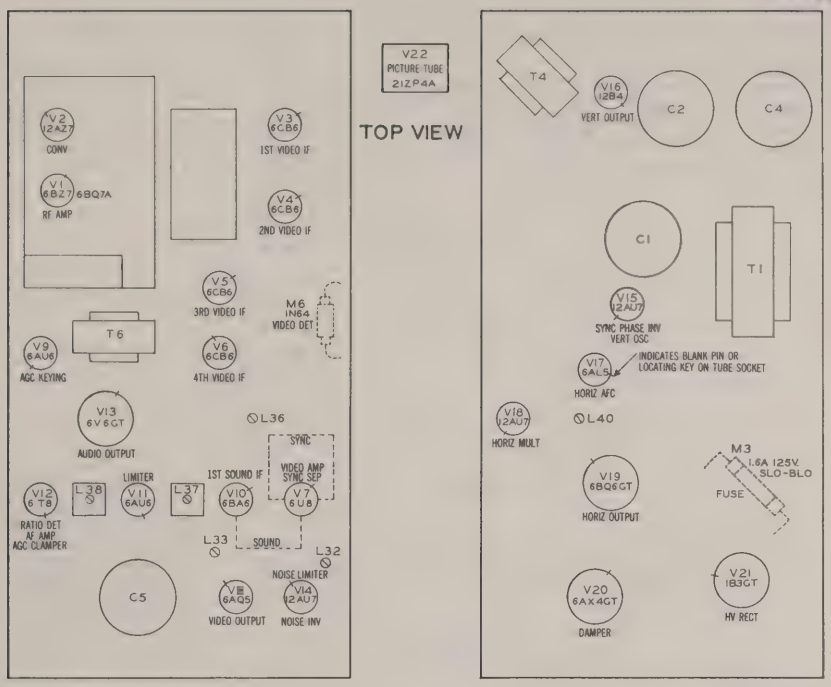

TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce the indicated symptoms. Refer to tube placement chart for location and type of tube.

POWER SUPPLY FAILURE
No raster, no sound - Selenium Rectifier (M1 & M2) fuse (M3 & M4)

LOSS OF PICTURE OR SOUND
No pic, no sound, has raster - V2, V3, V4, V5, V6
No pic, no sound, has snow -V1, V2, V3
No pic, has sound, has raster - V7, V18, V22
Has pic, no sound - V10, V11, V12, V13
Overloaded picture - V9, V12

SYNC FAILURE
No vert. sync - V15
No horiz. sync - V15, V17, V18
No vert. or horiz. sync - V7, V15

SWEEP FAILURE
No raster, has sound - V18, V19, V20, V21, V22
No vertical deflection - V15, V16
Poor vert. linearity or foldover - V15, V16
Poor horiz. linearity or foldover - V18, V19, V20
Narrow picture - V18, V19, V20, V21, M1, M2
Vert. off freq. - V15
Horiz. off freq. - V15, V17, V18

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

The high voltage lead should be securely taped and kept away from the chassis. Do not remove the horizontal oscillator tube (V18) to disable the high voltage.
Use an isolation transformer to protect the test equipment.

VIDEO IF ALIGNMENT

Set the contrast and brightness controls at maximum counter clockwise rotation.
Connect a 10KΩ carbon resistor to pin 1 of the video AGC test jack and another 10KΩ resistor to pin 5 of the same jack. Connect the free ends of the 10KΩ resistors together and attach the negative lead of a 10 volt bias supply to their junction. Connect the positive lead of the battery to chassis.
The IF shield must be in place during alignment.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	Direct	High side to an ungrounded tube shield floating over converter tube (V2). Low side to chassis.	Not used	47.25MC (400∿Mod)	4	Vert. Amp. thru 15KΩ to point (A). (Pin 2 of Video AGC test jack). Low side to chassis.	A1	Adjust for MINIMUM 400∿ indication on scope.
2.	"	"	"	41.25MC	"	"	A2	"
3.	"	"	"	42.7MC	"	"	A3	Adjust for maximum 400∿ indication on scope.
4.	"	"	"	44.75MC	"	"	A4	"
5.	"	"	"	45.7MC	"	"	A5	"
6.	"	"	"	44.4MC	"	"	A6	"
7.	"	"	"	43.0MC	"	"	A7	"
8.	"	"	"	42.0MC	"	"	A8	Adjust for maximum 400∿ indication on scope. Increase bias until pattern on scope is reduce 50% in amplitude and retouch A8 for maximum 400∿ indication on scope. Restore bias to -10 volts.
9.	"	"	44MC (10MC Swp)	42.0MC 45.75MC	"	"		Check for response curve similar to Fig. 1. If necessary, adjust A6 and A7 for maximum improvement. A6 affects tilt and A7 affects dip. A3 affects slope at 42.0MC side of curve. Adjust A4 and A5 for proper level at 45.75MC.

SOUND IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

Remove the first video IF tube (V3) from its socket.
Connect two matched 100KΩ (±1%) resistors in series from point (B) to chassis. The junction of these two resistors is alignment point (D) as shown on the schematic.
Leave the bias connected as under "Video IF Alignment". This will help to reduce circuit noise indications.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
10.	2200Ω carbon resistor	High side to point (A). Low side to chassis.	4.5MC (Unmod)	Any	DC Probe to point (B). Common to chassis.	A9, A10, A11, A12	Adjust for maximum deflection. Attenuate generator to maintain not more than 5 volts at VTVM.
11.	"	"	"	"	DC Probe to point (C). Common to point (D).	A13	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting Replace V3 in its socket.

SOUND IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use frequency modulated signal with 60∿ modulation and 450KC sweep. Use 120∿ sawtooth voltage in scope for horizontal deflection.
Remove V3 from its socket. Leave bias connected as under "Video IF Alignment".

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
10.	2200Ω Carbon Resistor	High side to point (A). Low side to chassis.	4.5MC (450KC Swp)	4.5MC	Any	Vert. Amp. to point (B). Low side to chassis.	A9, A10, A11, A12	Disconnect stabilizing capacitor C6. Adjust for curve of maximum amplitude and symmetry similar to Fig. 2.
11.	"	"	"	"	"	Vert. Amp. to point (C). Low side to chassis.	A13	Reconnect stabilizing capacitor. Adjust so that 4.5MC occurs at center of crossover lines as in Fig. 3. SLIGHTLY adjust A12 for maximum amplitude and straightness of crossover lines. Replace V3 in its socket.

4.5MC TRAP ALIGNMENT

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
12.	2200Ω Carbon Resistors	High side to point (A). Common to chassis.	Not used	4.5MC (400 ∿Mod)	Any	Vert. Amp. thru detector (Fig.4) to picture tube grid (pin 2). Low side to chassis.	A14	Adjust signal generator for maximum output and set vertical gain of scope to maximum. Adjust A14 for MINIMUM 400∿ indication on scope.

ALTERNATE 4.5MC TRAP ALIGNMENT

Tune in a TV station and turn the fine tuning control clockwise until a 4.5MC beat pattern appears in picture. Adjust A14 for minimum 4.5MC beat in picture (screw should be out of chassis approximately 5/8").

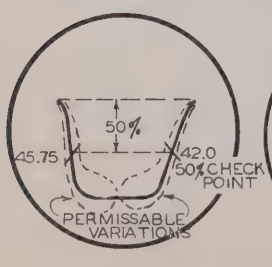

FIG.1

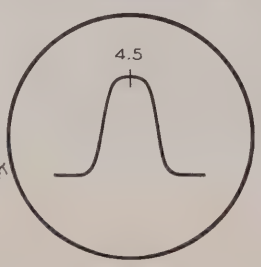

FIG.2

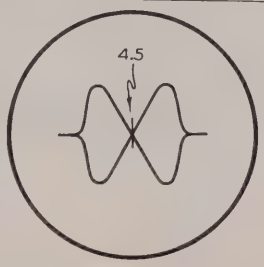

FIG.3

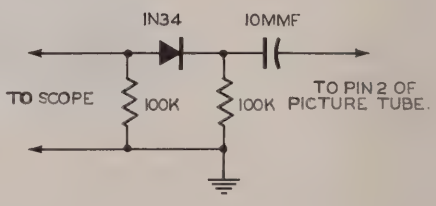

FIG.4

ALIGNMENT INSTRUCTIONS (cont)

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OSCILLATOR ALIGNMENT

Connect the negative lead of a 1.5 volt battery to the white lead on top of the tuner. Connect the positive lead to chassis.
Remove the gate pulse plug from its socket. Couple the 45.75MC output of a second signal generator to the first video IF amplifier tube (V3) by removing the tube shield and attaching the output leads of the generator to the ends of a few turns of wire wrapped around the tube.
The output is set at 45.75MC throughout the entire oscillator alignment.
Set the fine tuning control at the middle of its range (with the cam stop opposite the channel 8 oscillator tuning core).
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
13.	Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead.	Not used	211.25MC	13	Vert. Amp. thru 15KΩ to point (A). Low side to chassis.	A15	Adjust for zero beat with 45.75MC marker IF signal as indicated on scope.
				205.25MC	12		A16	
				199.25MC	11		A17	
				193.25MC	10		A18	
				187.25MC	9		A19	
				181.25MC	8		A20	
				175.25MC	7		A21	
				83.25MC	6		A22	
				77.25MC	5		A23	
				67.25MC	4		A24	
				61.25MC	3		A25	
				55.25MC	2		A26	

RF AND MIXER ALIGNMENT

Leave the 1.5 volt bais battery connected as under Oscillator alignment.
Adjust the scope controls so that the width of the response curve is double the height.
Overload may then be checked by varying the generator output. Readjust the scope vertical gain control to maintain the 2 to 1 ratio as the generator output is increased. Any change in shape of response curve indicates overload and generator output should be reduced.
The 2 to 1 width to height ratio should be maintained when comparing the response curves from channel to channel.
Disconnect the tuner coupling link at the IF terminal strip (near V3) and solder a 68Ω carbon resistor to the open end of the link. Remove the first IF tube (V3) from its socket.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
14.	Two 120Ω carbon resistors	Across antenna terminals with 120Ω in each lead.	213MC (10MC Swp)	213MC	13	Vert. amp. thru 100KΩ to point (E). Low side to chassis.	A27, A28	Check for a symmetrical approximately centered band pass similar to Fig. 5. If response is not flat between limits shown detune A28 counter clockwise until single peak appears. Adjust A27 until peak falls at 213MC. Adjust A28 for response similar to Fig. 5.
15.	"	"	177MC (10MC Swp)	177MC	7	"	A29, A30	Check for response as indicated by dotted lines in Figs. 6A and 6B. Adjust A29 and A30 for mirror image of original response curve (tilt in opposite direction); for example, if response curve appears as in Fig. 6A, adjust A29 and A30 until curve appears as in 6B. This adjustment over compensates to allow for channel 13 adjustment in next step. Repeat steps 14 and 15 until centered and symmetrical response curves are obtained on channels 13 and 7.
16.	"	"	85MC (10MC Swp)	85MC	6	"	A31, A32 A33	Adjust A31 and A32 for symmetrical approximately centered band pass. Detune A32 counter clockwise until single peak appears. Adjust A31 until peak falls at 85MC. Adjust A33 for maximum curve height and symmetry. Readjust A31 and A32 for symmetrical response as in Fig. 5.

VIDEO PEAKING COIL ADJUSTMENTS

In cases of excessive overshoot or smear on some stations it may be necessary to adjust A34 and A35. Alignment of the tuner and IF portions of the receiver must be correct before these adjustments are made. Counter clockwise adjustment will reduce the amount of overshoot and clockwise adjustment will reduce the amount of smear. Proper adjustment is the point of minimum smear and trailing whites.

UHF TUNER ALIGNMENT

This portion of the receiver has been properly aligned at the factory and is very stable.
Alignment of this portion of the receiver should not be required in the field.

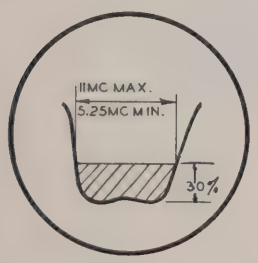


FIG. 5

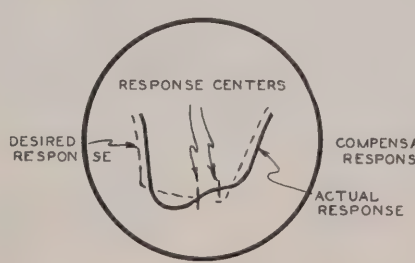
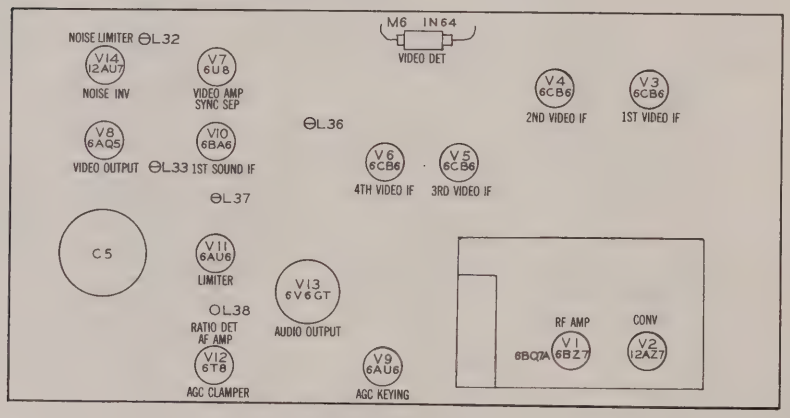


FIG. 6A FIG. 6B

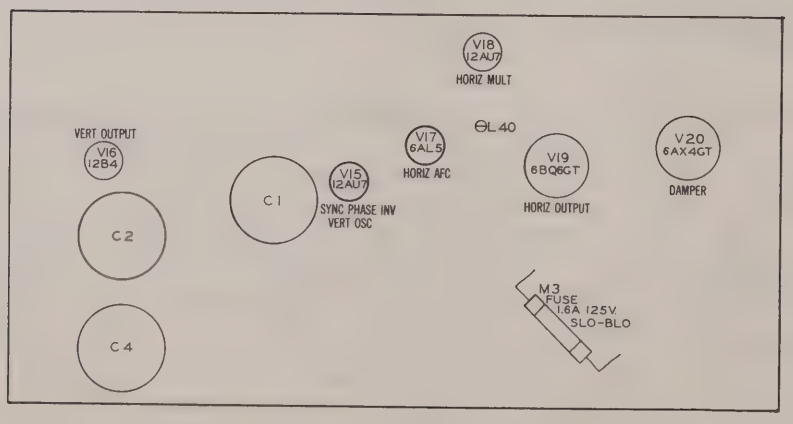
RESISTANCE MEASUREMENTS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6BZ7	†1KΩ	1 Meg	INF	0Ω	.1Ω	INF	570KΩ	0Ω	0Ω
V 2	12AZ7	† 16KΩ	100KΩ	0Ω	.1Ω	.1Ω	† 15KΩ	10KΩ	0Ω	0Ω
V 3	6CB6	110KΩ	68Ω	.1Ω	0Ω	† 2.4KΩ	† 2.4KΩ	0Ω		
V 4	6CB6	47KΩ	68Ω	.1Ω	0Ω	† 2.4KΩ	† 2.4KΩ	0Ω		
V 5	6CB6	1.5Ω	150Ω	.1Ω	0Ω	† 7.6KΩ	† 7.6KΩ	0Ω		
V 6	6CB6	1.5Ω	150Ω	.1Ω	0Ω	† 2.2KΩ	† 2.2KΩ	0Ω		
V 7	6U8	† 50KΩ	3.3KΩ	■ 4.7K	0Ω	.1Ω	■ 8.1KΩ	33Ω	0Ω	2.7 Meg
V 8	6AQ5	1.5Meg	390Ω	.1Ω	0Ω	† 2.5KΩ	† 0Ω	1.5 Meg		
V 9	6AU6	■ 52KΩ	22KΩ	.1Ω	0Ω	180KΩ	† 10KΩ	22K		
V 10	6BA6	† 540KΩ	■ 100Ω	.1Ω	0Ω	† 220Ω	† 220Ω	■ 100Ω		
V 11	6AU6	100KΩ	0Ω	.1Ω	0Ω	† 12KΩ	† 12KΩ	0Ω		
V 12	6T8	INF	33KΩ	INF	.1Ω	0Ω	600KΩ	0Ω	10 Meg	† 275KΩ
V 13	6V6GT	INF	.1Ω	† 5.2K	† 4.7KΩ	680KΩ	† 0Ω	0Ω	120Ω	
V 14	12AU7	■ 22 Meg	47KΩ	0Ω	0Ω	0Ω	■ 180KΩ	■ 22Meg	3,3KΩ	.1Ω
V 15	12AU7	† 14KΩ	1 Meg	2.2KΩ	0Ω	0Ω	▲ 1.8Meg	350KΩ	1KΩ	.1Ω
V 16	12B4	470Ω	4.2Meg	0Ω	.1Ω	.1Ω	INF	4.2Meg	INF	† 284Ω
V 17	6AL5	4.8Meg	4.8Meg	0Ω	.1Ω	15KΩ	INF	15KΩ		
V 18	12AU7	† 57KΩ	140KΩ	1.2KΩ	.1Ω	.1Ω	† 25KΩ	9.4Meg	1.2KΩ	0Ω
V 19	6BQ6GT	1.6Meg	.1Ω	† 11.4KΩ	† 4.6KΩ	1 Meg	47KΩ	0Ω	0Ω	TOP CAP ▲ 27Ω
V 20	6AX4GT	† 0Ω	INF	150KΩ	INF	† 2Ω	▲ 45Ω	0Ω	.1Ω	
V 21	1B3GT	PINS 1-8 HAVE INF. RESISTANCE								TOP CAP ▲ 867Ω
V 22	21ZP4A	0Ω	470KΩ	PIN 10 ▲ 47KΩ	PIN 11 † 220KΩ	PIN 12 .1Ω				

† MEASURED FRO M OURPUT OF M1.
■ MEASURED FROM PIN 7 OF V10.
▲ MEASURED FROM PIN 3 OF V20.

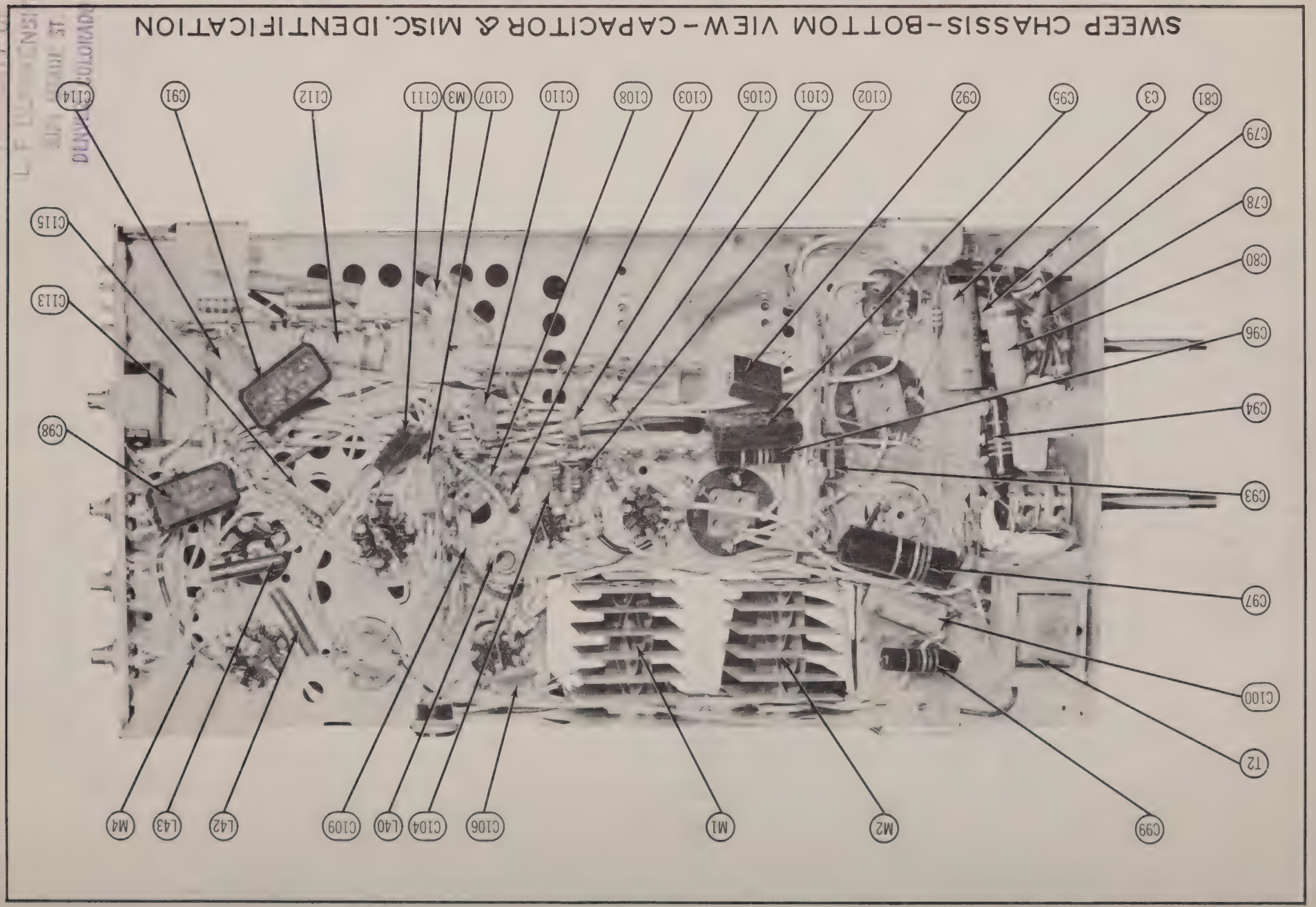


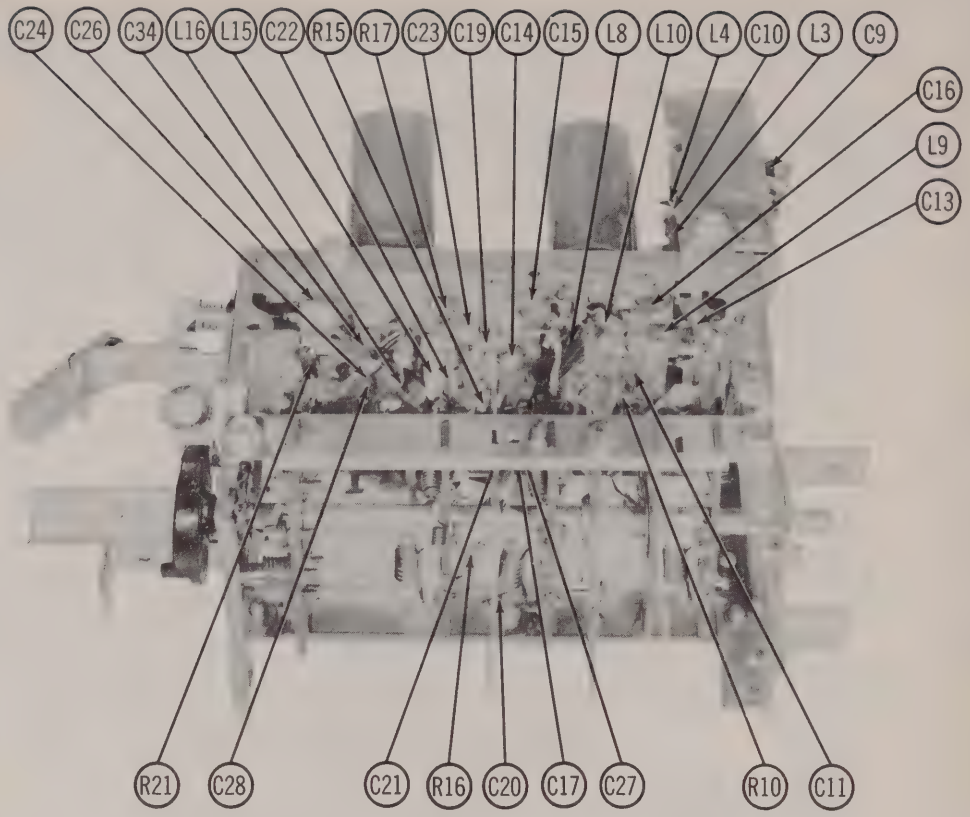
BOTTOM VIEW



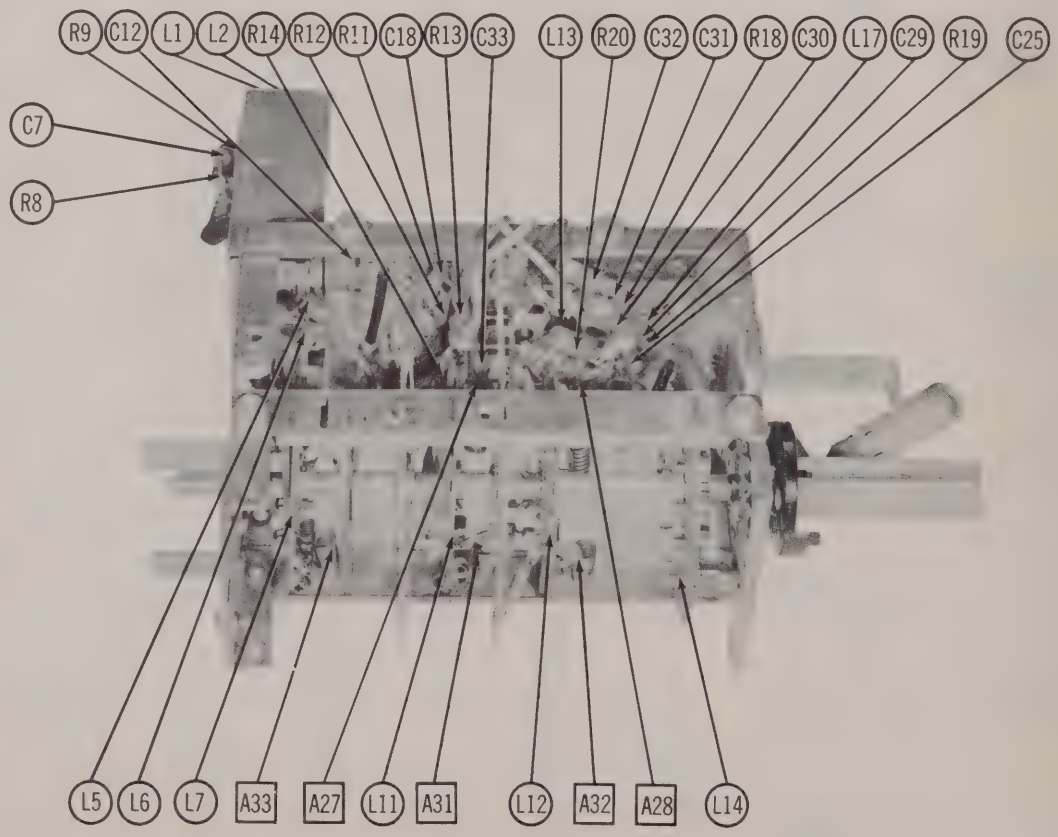
TUBE PLACEMENT CHART

SWEEP CHASSIS-BOTTOM VIEW-CAPACITOR & MISC. IDENTIFICATION





VHF TUNER-RIGHT SIDE



VHF TUNER-LEFT SIDE

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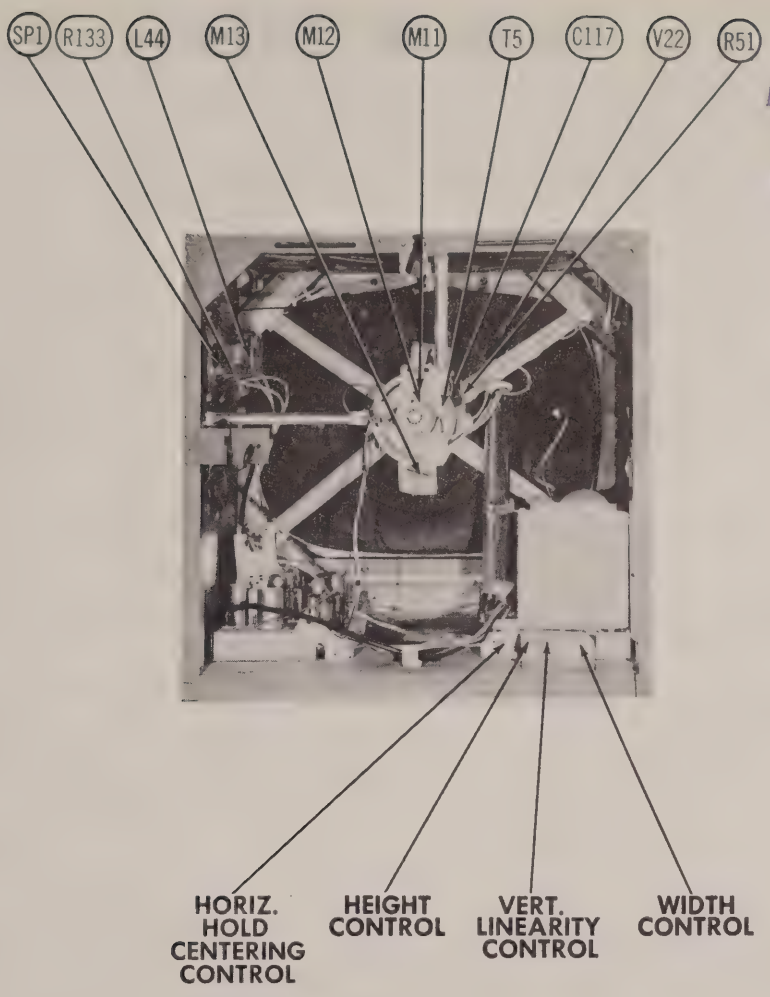

CABINET—REAR VIEW

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Turn the set on and tune in a TV station, preferably a test pattern.

Reduce the picture width until approximately one inch of blank screen appears on each side of the picture. Increase the brightness control setting until the blanking time becomes visible as indicated by a dark bar at each side of picture.

Connect a .1MFD capacitor from pin 2 of the gate pulse socket to chassis.

Set the horizontal hold control at the center of its range.

Adjust the horizontal hold centering control until the picture is centered between the two blanking bars.

Remove the 1 MFD capacitor.

Adjust the horizontal ringing coil slug (B1) until the picture is again centered between the two blanking bars.

Rotate the horizontal hold control through its range. The picture should lose sync at both extremes of rotation. If it does not, readjust the horizontal hold centering control until that condition is obtained. Check the number of diagonal bars on either side of the pull in range of the horizontal hold. There should be 1 or 2 bars present . If proper pull-in is not obtained, repeat the above procedure.

Adjust the horizontal width control for a picture slightly wider than necessary to fill the picture mask horizontally.

TROUBLE SHOOTING AIDS

CAUTION

Use a line isolation transformer of at least 225 watts rating, to remove shock hazzard and prevent damage to receiver and/or test equipment.

SWEEP

HORIZONTAL

LOSS OF SWEEP

Follow procedure outlined under "Loss of High Vol tage".

INSUFFICIENT SWEEP

Check by substitution V18, V19 and V20. Check adjustment of the width control. Check waveform W18.

If Satisfactory	If Unsatisfactory
Check T3, T5A, C112, C113, C114, R120, R124, R125 and other associated components.	Check C108, C109, C111, R111, R112, R114, R115, R119 and other associated components.

DRIVE LINES

Check by substitution V18, V19 and V20. Check C110, C111, C114, C116, T3, T5A, R116, R124 and other associated components.

COMPRESSED AT LEFT SIDE

Check by substitution V18, V19 and V20. Check components associated with the horizontal output and damper stages especially T3 and T5A.

FOLDS

Follow procedure outlined under Drive Lines.

PIE CRUST EFFECT

Check by substitution V18, V19 and V20. Check C106 for open. Check T3 and T5A.

XMAS TREE EFFECT

Substitute V18. Check L40, C107, C108, C109 and other associated components.

VERTICAL

LOSS OF SWEEP

Check by substitution V15 and V16. Check waveform W12.

If Satisfactory	If Unsatisfactory
Check T4, T5B, R103 and other associated components.	Check R102, C96, C97, T2 and other associated components.

INSUFFICIENT SWEEP

Check adjustment of height and vertical linearity controls. Follow procedure outlined under "Loss of Sweep".

COMPRESSED AT BOTTOM

Check by substitution V15 and V16. Check T4, T5B, C4D and other associated components.

COMPRESSED AT TOP

Check by substitution V15 and V16. Check T2, C95, C97 and other associated circuit components.

FOLDS

Check by substitution V15 and V16. Check associated components especially T2, T4, C95 and C97.

SYNC

LOSS OF VERTICAL AND HORIZONTAL SYNC

Check by substitution V7, V14 and V15. Check C87, C88, C89, C91, R87, R89, R90, R80, R83, and other associated components.

LOSS OF VERTICAL SYNC-HORIZONTAL SYNC SATISFACTORY

Check by substitution V7, V14 and V15. Check waveform W10.

If Satisfactory	If Unsatisfactory
Check components associated with V15B especially T2 and R96.	Check vertical integrator and other associated components. Check video IF stages for overloading.

LOSS OF HORIZONTAL SYNC-VERTICAL SYNC SATISFACTORY

Check by substitution V17 and V18. Check C100, C102, C107, C108, C109, R113, R114, R109, R117, C103, C104 and other associated components.

HORIZONTAL BENDING

Check by substitution V7, V14, V15, V17 and V18. Check horizontal AFC filter network . Check waveform W15 for vertical sync pulses.

VIDEO

LOSS OF VIDIO

Check by substitution V7 and V8. Check C61, C63, R43, R46, picture tube and other associated components.

SOUND BARS (4. 5MC BEAT)

Adjust tuner fine tuning for best picture and sound. Check 4. 5MC trap adjustment (A14). Check video IF alignment.

POOR CONTRAST

Check by substitution V7 and V8. Check video detector crystal and assembly. Check contrast control, picture tube and other associated components.

NEGATIVE PICTURE

Check by substitution V9, V8, V7, V4, V3 and V1. Check video detector assembly. Check AGC operation. Check picture tube.

SMEAR

Check by substitution V7 and V8. Check video detector assembly. Check C61, C63, R40, R42, R43, R44, R46, R48, L35, picture tube and other associated components.

WIDE BLACK BAR ACROSS PICTURE

Check V1, V3, V4, V5, V6, V7 and V8 for heater to cathode leakage.

AUDIO

WEAK OR NO SOUND

Check by substitution V10, V11, V12 and V13. Check stages V12B and V13 using audio signal generator. Apply audio signal across R72.

If Satisfactory	If Unsatisfactory
Check ratio detector and audio IF alignment and components.	Check components associated with V12B and V13 especially C84 and T6.

BUZZ

Adjust tuner fine tuning for best picture and sound. Adjust A13 for minimum buzz. If still unsatisfactory, substitute V12. Check C6 and C74 for leakage.

DISTORTED

Follow procedure outlined under "Weak or No Sound".

PARTS LIST & DESCRIPTION

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA		RETMA BASE TYPE	NOTES
		PHILCO PART No.	STANDARD REPLACEMENT		
V1A	RF Amplifier	6BZ7	6BZ7	9AJ	
B	RF Amplifier	6BQ7A	6BQ7A	9AJ	
V2	Converter	12AZ7	12AZ7	9A	
V3	1st. Video IF Amp.	6CB6	6CB6	7CM	
V4	2nd. Video IF Amp.	6CB6	6CB6	7CM	
V5	3rd. Video IF Amp.	6CB6	6CB6	7CM	
V6	4th. Video IF Amp.	6CB6	6CB6	7CM	
V7	Video Amplifier-Sync Separator	6U8	6U8	9AE	
V8	Video Output	6AQ5	6AQ5	7BZ	
V9	AGC Keying	6AU6	6AU6	7BK	
V10	Sound IF Amp.	6BA6	6BA6	7BK	
V11	Limiter	6AU6	6AU6	7BK	
V12	Ratio Detector-AF Amp.-AGC Clamper	6T8	6T8	9E	
V13	Audio Output	6V6GT	6V6GT	7S	
V14	Noise Limiter-Noise Inverter	12AU7	12AU7	9A	
V15	Sync Phase Inv.-Vert. Oscillator	12AU7	12AU7	9A	
V16	Vert. Output	12B4	12B4	9AG	
V17	Horiz. AFC	6AL5	6AL5	6BT	
V18	Horiz. Mult.	12AU7	12AU7	9A	
V19	Horiz. Output	6BQ6GT	6BQ6GT	6AM	
V20	Damper	6AX4GT	6AX4GT	4CG	
V21	HV Rectifier	1B3GT	1B3GT	3C	

CATHODE-RAY TUBE

ITEM No.	REPLACEMENT DATA				RETMA BASE TYPE	NOTES
	PHILCO PART No.	SYLVANIA PART No.	GENERAL ELECTRIC PART No.	WESTINGHOUSE PART No.		
V22	21ZP4A	21ZP4A 21ZP4B 21ZP4① 21YP4 ① 21YP4A ①	21ZP4A	21ZP4A	12N 12N 12N 12L 12L	① Circuit changes necessary

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	PHILCO PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C1	120	150	30-2568-51	AFHS1-73		XA007		FP140	TVL-1428	
C2	120	150	30-2568-51	AFHS1-73		XA007		FP140	TVL-1428	
C3	10	50	30-2417-3	PRS350/10		BR105		TC32	TVA-1304	
C4A	■100	300	30-2584-27			D117		FP465	TVL-4802	
B	▲10	300						2N531		
C	▲10	475								
D	100	25								
C5A	▲40	300	30-2570-57	AFH4-18		D111		FP476	TVL-4578	
B	▲10	300								
C	10	300								
D	■20	300								
C6	2	50	30-2417-7	E26E6		BBR2-50		TC302	TVA-1301	
C7	2	50	30-2417-7	E26E6		BBR2-50		TC302	TVA-1301	
C8	470		30-1225-18	SI470	D6-471	TP46	GP2K-471	UC-5347	5GA-T47	
C9	470		30-1225-18	SI470	D6-471	TP46	GP2K-471	UC-5347	5GA-T47	
C10	20		62-020309 011	SI20NP0	TCZ-20	TZ13	NP0K-200	ZT-542	5TCC-Q2	
C11	39		62-03940911	SI39	D6-390	TP28	GP1K-390	UC-5439	5GA-Q39	
C12	1000		30-1245-1	EF-001	MFT-1000				503C-D1	
C13	220		62-122001001	SI220	D6-221	TP39	GP2K-221	UC-5322	5GA-T22	
C14	.5-3		31-6520-3		829-3		3115-01-0R5	CT565A		
C15	680		62-168001001	SI680	D6-681	TP50	GP2K-681	UC-5368	5GA-T68	
C16	220		62-122001011	SI220	D6-221	TP39	GP2K-221	UC-5322	5GA-T22	
C17	150		30-1238-9	BPD-00015	D6-151	G046	811-151	UC-5315	5GA-T15	
C18	10000		30-1238-2	BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C19	.6		311-5050-3							
C20	1.45									
C21	3									
C22	39		62-03940911	SI39	D6-390	TP28	GP1K-390	UC-5439	5GA-Q39	
C23	.5-3		31-6520-3		829-3		311-01-0R5	CT565A		
C24	1.5		30-1221-8							
C25	12		30-1224-57							
C26	5		30-1224-35	SI5N750	TCN-5	N011	N750K-050		5TCUB-V5	
C27	1000		30-1245-1	BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C28	220		62-122001011	SI220	D6-221	TP39	GP2K-221	UC-5322	5GA-T22	
C29	7.5		30-1224-13							
C30	1-5		31-6520-11		829-6		3139-01-10			
C31	680		62-168001021	SI680	D6-681	TP50	GP2K-681	UC-5368	5GA-T68	
C32	680		62-168001021	SI680	D6-681	TP50	GP2K-681	UC-5368	5GA-T68	
C33	1000		30-1245-1	BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C34	220		62-122001011	SI220	D6-221	TP39	GP2K-221	UC-5322	5GA-T22	
C35	5		30-1224-28	SI5NP0	TCZ-4.7	Z011	NP0-831-050	ZT-555	5TCCB-V47	
C36	1-5		31-6520-9		829-6		3139-01-10			
C37	5		30-1224-28	SI5NP0	TCZ-4.7	Z011	NP0-831-050	ZT-555	5TCCB-V47	
C38	1-5		30-6520-9		829-6		3139-01-10			
C39	1-5		30-6520-9		829-6		3139-01-10			
C40	100		30-1224-18	SI100	D6-101	TP34	GP1K-101	UC-531	5GA-T1	
C41	680		62-168001001	SI680	D6-681	TP50	GP2K-681	UC-5368	5GA-T68	
C42	1500		62-215001011	SI1500	D6-152	TP54	GP2L-152	UC-5215	5HK-D15	
C43	18		62-018400021	SI18	D6-180	TP12	GP1K-180	UC-5418	5GA-Q18	
C44	1-5		31-6520-9		829-6		3139-01-10			
C45	680		62-168001001	SI680	D6-681	TP50	GP2K-681	UC-5368	5GA-T68	
C46	680		62-168001001	SI680	D6-681	TP50	GP2K-681	UC-5368	5GA-T68	
C47	680		62-168001001	SI680	D6-681	TP50	GP2K-681	UC-5368	5GA-T68	

PARTS LIST AND DESCRIPTIONS (Continued)

CAPACITORS (cont)

ITEM No.	RATING CAP.	RATING VOLT	PHILCO PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C48	1-5		31-6520-9		829-6		3139-01-10			
C49	2000			SI2000	D6-202	TP56	GP2-333-202	UC-522	5HK-D2	
C50	2000			SI2000	D6-202	TP56	GP2-333-202	UC-522	5HK-D3	
C51	680		62-168001001	SI680	D6-681	TP50	GP2K-681	UC-5368	5GA-T68	
C52	680		62-168001001	SI680	D6-681	TP50	GP2K-681	UC-5368	5GA-T68	
C53	1-5		31-6520-9		829-6		3139-01-10			
C54	2000			SI2000	D6-202	TP56	GP2-333-202	UC-522	5HK-D2	
C55	2000			SI2000	D6-202	TP56	GP2-333-202	UC-522	5HK-D2	
C56	1-5		31-6520-9		829-6		3139-01-10			
C57	10		62-010409001	SI10	D6-100	TP09	GPK-100	UC-541	5GA-Q1	
C58	.015	200		P268-015		CUB6815			5TCCB-S15	
C59	68		62-068409011	SI68	D6-680	TP32	GPK-680	UC-5468	5GA-Q68	
C60	33		62-033009001	SI33	D6-330	TP27	GPK-330	UC-5433	5GA-Q33	
C61	.047	200		P268-047	DF-503	CUB4847		PT4147	2TM-S47	
C62	320	500	60-10225417	1469-00025		32S1-723		MCB240		
C63	.047	400		P488-047	DF-503	CUB4347		PT4147	4TM-S47	
C64	.1	200		P288-1	DF-104	CUB23P1		PT401	2TM-P1	
C65	.047	200		P288-047	DF-503	CUB4347		PT4147	2TM-S47	
C66	.01	400		P488-01	D6-103	CUB4S1	GP2-333-103	PT4Li	4TM-S1	
C67	2.2		30-1221-6	SI2.2NP0	TCZ-2.2	TZ05	NP0K-2R2		5TCCB-V22	
C68	18		62-018409031	SI18NP0	TCZ-18	TZ12	NP0K-180		STCC-Q18	
C69	1500			SI1500	D6-152	TP54	GP2L-152	UC-5215	5HK-D15	
C70	.0015	400		P688-0015	D6-152	CUB6D15	GP2L-152	PT6215	6TM-D15	
C71	.047	400		P488-047	DF-503	CUB4S47		PT4147	4TM-S47	
C72	56		30-1234-25	SI56	D6-560	TP31	GPK-560	UC-5456	5GA-Q56	
C73	.0022	400		P688-0022	D6-222	CUB4D22	GP2-333-222	PT6222	6TM-D22	
C74	330		62-133001001	SI330	D6-331	TP43	GPK-331	UC-5333	5GA-T33	
C75	330		62-133001001	SI330	D6-331	TP43	GPK-331	UC-5333	5GA-T33	
C76	1500			SI1500	D6-152	TP54	GP2L-152	UC-5215	5HK-D15	
C77	.0022	400		P688-0022	D6-222	CUB6D22	GP2-333-222	PT6222	6TM-D22	
C78	10000			BPD-02	DD-103	K082	811-01	DC-511	5HK-S1	
C79	10000			BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C80	.03	400		P688-03		CUB683		PT633	6TM-S3	Note 1
C81	5000			BPD-005	DD-502	K080	811-005	DC-521	5HK-D5	
C82	1500			SI1500	D6-152	TP54	GP2L-152	UC-5215	5HK-D15	
C83	.01	400		P488-01	D6-103	CUB4S1	GP2-333-103	PT4Li	4TM-S1	
C84	.0068	400		P688-0068	D6-682	CUB6D68	GP2-333-682		6TM-D68	
C85	.0068	1000	30-4650-91	P1088-0068		CUB1D68			MB-D68	
C86	10000			BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C87	.01	400		P488-01	D6-103	CUB4S1	GP2-333-103	PT4Li	4TM-S1	
C88	.1	200		P288-1	DF-104	CUB23P1		PT401	2TM-P1	
C89	.0047	600		P688-0047	D6-472	CUB6D47	GP2-333-472	PT6247	6TM-D47	
C90	470		30-1226-18	SI470	TP46	GPK-471	UC-5347	5GA-T47		
C91	.047	400		P488-047	DF-503	CUB4S47		PT4147	4TM-S47	
C92	.01	400		P488-01	D6-103	CUB4S1	GP2-333-103	PT4Li	4TM-S1	
C93	.0022	400		P688-0022	D6-222	CUB6D22	GP2-333-222	PT6222	6TM-D22	
C94	.033	300		P488-033				PT4133		
C95	.047	400		P488-047	DF-503	CUB4S47		PT4147	4TM-S47	
C96	.01	400		P688-015		CUB6S15			6TM-S15	
C97	.22	400		P488-22		CUB4P22		PT4025	4TM-P22	
C98	.1	200		P288-1	DF-104	CUB23P1		PT401	2TM-P1	
C99	.022	400		P488-022	DF-203	CUB4S22		PT4122	4TM-S22	
C100	.047	400		P488-047	DF-503	CUB4347		PT4147	4TM-S47	
C101	1000			BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C102	1000			BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C103	.01	400		P488-01	D6-103	CUB4S1	GP2-333-103	PT4Li	4TM-S1	
C104	10000		30-1238-2	BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C105	1000		30-1238-3	BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C106	10000		30-1238-2	BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C107	2200	500	60-20225004			1RSD22				
C108	82	500	60-00825317			32R5Q82				
C109	390	500	60-10395417	1469-0004		5RS739		MCB243	MS-34	
C110	390	500	60-10395417	1469-0004		5RS739		MCB243	MS-34	
C111	.0047	600		P688-0047	D6-472	CUB6D47	GP2-333-472	PT6247	6TM-D47	
C112	.047	400		P488-047	DF-503	CUB4S47		PT4147	4TM-S47	
C113	.47	300	30-4681-18	P288-47		CUB2P47		PT4047	2TM-P47	
C114	.047	400		P688-047	DF-503	CUB6S47		PT6147	6TM-S47	
C115	.01	400		P488-01	D6-103	CUB4S1	GP2-333-103	PT4Li	4TM-S1	
C116	68	2000	30-1246-1	HVD30-000068						
C117	.01	600		P688-01		CUB6S1		PT6Li	6TM-S1	

Note 1. Value may vary from .01MFD to .05MFD. Use same value for replacement.

CONTROLS

ITEM No	RATING RESISTANCE	RATING WATTS	PHILCO PART No	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No	INSTALLATION NOTES
R1A	5 Meg		33-5565-44	* QJ-340	RTY-360	SBBT-852-S	UP10RL	Tone-Panel
B	2 Meg		Not Reg.				UR26T95	Volume-tapped at 1 Meg -Rear
C	Switch		Not Reg.				US-26	Attach to R1B
R2A	50KΩ		33-5563-50	• QJ-356	RTV-358	SBB-718	UP54L] †	Horiz Hold - Panel
B	250KΩ		Not Reg.				UR254L]	Vert. Hold-Rear
R3A	2500Ω	3	83-5563-51	■ QJ-357	RTY-359		WP252	Contrast-Panel Wire wound
B	100KΩ		Not Reg.				UR15L	Brightness-Rear
R4A	1.5 500Ω	2	33-5565-51	WK-13, 500	A43-1500D	††VK-137	RL500L	Width - Wire wound
B	Shaft		Not Reg.	Not Reg.	FKS-1/4	Not Reg.	Not Reg.	Attach to R4A
R5A	5 Meg		33-5565-31	QU-141	A47-5Meg-S	AB-87	SU-67	Vert. Linearity
B	Shaft		Not Reg.	RQ	FKS-1/4	AK-1	Not Reg.	Attach to R5A
R6A	2.5Meg		33-5565-32	QU-239	A47-2.5Meg-S	AB-83	SU-565	Height
B	Shaft		Not Reg.	RQ	FKS-1/4	AK-1	Not Reg.	Attach to R6A
R7A	250KΩ		33-5565-17	QU-130	A47-250K-S	AB-80	SU-46	Horiz. Hold Centering
B	Shaft		Not Reg.	RQ	FKS-1/4	AK-1	Not Reg.	Attach to R7A

* CONCENTRIKIT EQUIVALENT KIT K-2 BASE ELEMENTS & SHAFTS B12-141 & P1-300 (Panel) B18-139 & R1-216 (Rear) & SWITCH 76-1.

♦ CONCENTRIKIT EQUIVALENT KIT K-3 BASE ELEMENTS & SHAFTS B11-123 & P1-300 (Panel) B11-130 & R1-216 (Rear)

■ CONCENTRIKIT EQUIVALENT KIT K-3 BASE ELEMENTS & SHAFTS W17-111 & P3-131 (Panel) B11-128 & R1-216 (Rear)

† Universal replacement (Mallory exact duplicate Part No. UB968)

†† Add 2500Ω resistor in series with the control.

RESISTORS

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA PHILCO PART No.	REPLACEMENT DATA IRC PART No.	NOTES
R8	1 Meg	½		BTS-1 Meg	
R9	1 Meg	½		BTS-1 Meg	
R10	10KΩ	½		BTS-10K	
R11	1000Ω	½		BTS-1000	
R12	1 Meg 0%	½		BTS-1 Meg 0%	
R13	1 Meg 5%	½		BTS-1 Meg 5%	
R14	1000Ω	½		BTS-1000	
R15	820Ω	½		BTS-820	
R16	4700Ω	½		BTS-4700	
R17	100KΩ	½		BTS-100K	
R18	1000Ω	½		BTS-1000	
R19	10KΩ	½		BTS-10K	
R20	15KΩ	1		BTS-15K	
R21	10Ω	½		BTS-10	
R22	15KΩ	½		BTS-15K	
R23	68Ω	½		BTS-68	
R24	220Ω	½		BTS-220	
R25	47KΩ	½		BTS-47K	
R26	47KΩ	½		BTS-47K	
R27	47KΩ	½		BTS-47K	
R28	68Ω	½		BTS-68	
R29	220KΩ	½		BTS-220	
R30	150Ω	½		BTS-150	
R31	220Ω	½		BTS-220	
R32	5600Ω	½	66-2564340	BTS-5600	
R33	15KΩ	½		BTS-15K	
R34	150Ω	½		BTS-150	
R35	220Ω	½		BTS-220	
R36	12KΩ	½		BTS-12K	
R37	3300Ω	½		BTS-3300	
R38	6800Ω	½		BTS-6800	
R39	33Ω	½		BTS-33	
R40	3300Ω	½		BTS-3300	
R41	47KΩ	½		BTS-47K	
R42	4700Ω	½		BTS-4700	
R43	4700Ω	½		BTS-4700	
R44	L 5Meg	½		BTS-L 5Meg	
R45	1 Meg	½		BTS-1 Meg	
R46	2500Ω	7	33-1335-93		
R47	3300Ω	½		BTS-3300	
R48	470KΩ	½		BTS-470K	
R49	180KΩ	½		BTS-180K	
R50	22KΩ	½		BTS-22K	
R51	470KΩ	1	66-4474340	BTA-470K	
R52	560KΩ	½		BTS-560K	
R53	47KΩ	½		BTS-47K	
R54	5. 5Meg	½		BTS-5. 5Meg	
R55	10KΩ	½		BTS-10K	
R56	47KΩ	½		BTS-47K	
R57	470KΩ	½		BTS-470K	
R58	47KΩ	½		BTS-47K	
R59	330KΩ	½		BTS-330K	
R60	2200Ω	½		BTS-2200	
R61	1 Meg	½		BTS-1 Meg	
R62	1 Meg	½		BTS-1 Meg	
R63	100Ω	½		BTS-100	
R64	220Ω	½		BTS-220	
R65	100KΩ	½		BTS-100K	
R66	22KΩ	½		BTS-22K	
R67	12KΩ	1	66-3124340	BTA-12K	
R68	270Ω	½		BTS-270	
R69	22KΩ	½		BTS-22K	

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA PHILCO PART No.	REPLACEMENT DATA IRC PART No.	NOTES
R70	33KΩ	½		BTS-33K	
R71	68KΩ	½		BTS-68K	
R72	10 Meg	½		BTS-10 Meg	
R73	15KΩ	½		BTS-15K	
R74	270KΩ	½		BTS-270K	
R75	680KΩ	½		BTS-680K	
R76	1. 5 Meg	½		BTS-1. 5 Meg	
R77	12Ω	1	66-1124340	BTA-120	
R78	4700Ω	10	33-3446-1		
R79	47KΩ	½		BTS-47K	
R80	22Meg	½		BTS-22Meg	
R81	3300Ω	½		BTS-3300	
R82	47KΩ	½		BTS-47K	
R83	220KΩ	½		BTS-220K	
R84	470KΩ	½		BTS-470K	
R85	33KΩ	½		BTS-33K	
R86	68KΩ	½		BTS-68K	
R87	2. 7Meg	½		BTS-2. 7Meg	
R88	150KΩ	½		BTS-150K	
R89	47KΩ	½		BTS-47K	
R90	1 Meg	½		BTS-1 Meg	
R91	3900Ω	½		BTS-3900	
R92	10KΩ	½		BTS-10K	
R93	33KΩ	½		BTS-33K	
R94	2200Ω	½		BTS-2200	
R95	4700Ω	½		BTS-4700	
R96	220KΩ	½		BTS-220K	
R97	1000Ω	½		BTS-1000	
R98	56KΩ	½		BTS-56K	
R99	330KΩ	½		BTS-330K	
R100	6800Ω	½		BTS-6800	
R101	1 Meg	½		BTS-1 Meg	
R102	2. 2Meg	½		BTS-2. 2Meg	
R103	470Ω	1		BTA-470	
R104	1000Ω	½		BTS-1000	
R105	1000Ω	½		BTS-1000	
R106	100KΩ	½		BTS-100K	
R107	100KΩ	½		BTS-100K	
R108	4. 7Meg	½		BTS-4. 7Meg	
R109	15KΩ	½		BTS-15K	
R110	4. 7Meg	½		BTS-4. 7Meg	
R111	1200Ω	½		BTS-1200	
R112	15KΩ	½		BTS-15K	
R113	56KΩ	½		BTS-56K	
R114	47KΩ	½		BTS-47K	
R115	10KΩ	½		BTS-10K	
R116	10KΩ	½		BTS-10K	
R117	470KΩ	1	66-3474340	BTA-470K	
R118	1 Meg	½		BTS-1 Meg	
R119	1 Meg	½		BTS-1 Meg	
R120	4200Ω	5	33-1335-101		
R121	82KΩ	1	66-3824340	BTA-82K	
R122	47KΩ	1	66-3474340	BTA-47K	
R123	330KΩ	½		BTS-330K	
R124	27KΩ	½		BTS-27K	
R125	470Ω	½		BTS-470	
R126	4. 7Ω	1	66-0474340		
R127	5Ω	10	33-3448-5	1 3/4A-5	
R128	47KΩ	½	66-3474340	BTS-47K	
R129	*				
R130	15KΩ	½		BTA-15K	
R131	10Ω	½		BTS-10	
R132	10Ω	½		BTS-10	
R133	20Ω	5			
R134	2000Ω	7			

* 20 inches of # 24 wire.

TRANSFORMER (FILAMENT)

ITEM No.	RATING PRI.	RATING SEC. 1	RATING SEC. 2	REPLACEMENT DATA PHILCO PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	RCA TYPE No.	Halldorson PART No.	Thordarson PART No.
T1	117VAC ⑤.65A	6.3VAC ⑤9.1A		32-8574-1	F-8306①	P-2948①	F-21A ①			

① Tape center tap on 6.3 volt winding.
② Drill new mounting holes.

TRANSFORMERS (SWEEP CIRCUITS)

ITEM No	USE	REPLACEMENT DATA PHILCO PART No.	Stancor PART No	Merit PART No	Triad PART No	RCA TYPE No	Halldorson PART No	Thordarson PART No
T2	Vert. Osc. Trans.	32-8431-8 32-8431-2 ①	A-8126 ②	A-3004		332T1 ⑯		
T3	Horiz. Output Trans.	32-8907	A-8220⑭⑮		D-24 & WC-11 ⑮			FLY-8 & WC-20⑮
T4	Vert. Output Trans.	32-8539-1	A-8147					
T5A	Yoke-Horiz. (29MH)	32-8539 ⑦	DY-12⑥⑨	MDF-71④ ⑨	Y-24②⑨	DF604⑧⑨		
B	Yoke-Vert. (40MH)	32-9048						

① Alternate vertical oscillator transformer.
② Drill one new mounting hole.
③ Connect as in original circuit.
④ Use original mounting plate.
⑤ Connect terminal #6 to terminal #7, then connect original terminal #5 to new terminal #9, original 2 to new #5, original #6 to new # "7", original #1 to new #1. Connect primary of WC-11 across terminals #1 and #3. Secondary to AFC and AGC. H picture is out of phase reverse secondary.
⑥ Connect original terminal #5 to new terminal #2, original #2 to new #8, original #6 to new #7, original #1 to new #5, connect primary of WC-20 across terminals #5 and #6, secondary to AFC and AGC. H picture is out ph ase, reverse secondary.
⑦ Alternate vertical output transformer.
⑧ Use original yoke network.
⑨ Use original yoke plug and leads connected as in original circuit.
⑩ Connect original terminal #5 to new terminal #10, original #2 to new #9, original #1 to new #3, original #8 to new #2, original #7 to new #1. Disconnect one end of C115 and insert R124 in series with it.

TRANSFORMER (AUDIO OUTPUT)

ITEM No	IMPEDANCE PRI.	IMPEDANCE SEC.	REPLACEMENT DATA PHILCO PART No	Stancor PART No	Merit PART No	Triad PART No	Halldorson PART No	Thordarson PART No	NOTES
T6	4.2KΩ	3.4Ω	32-8582	A-3849	A-3019	S-52Ⓒ	Z1002		① Drill one new mounting hole.

SPEAKER

ITEM No.	RATINGS SIZE	RATINGS FIELD	RATINGS V. C. IMP.	REPLACEMENT DATA PHILCO PART No.	JENSEN PART No.	QUAM PART No	NOTES
SP1	6"	PM	3.4Ω	36-1641-16	ST-106 Mod. P6-X	6A21	

COILS (RF-IF)

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA PHILCO PART No	MEISSNER PART No.	MERIT PART No.	MILLER PART No	NOTES
L1	Ant. Trans.	.7Ω	.7Ω	32-4432-3				
L2	Ant. Trans.	.7Ω	.7Ω	32-4432-3				
L3	IF Trap	0Ω		32-4552-1				Wound on 22MMF capacitor
L4	FM Trap	0Ω		32-4550-3				
L5	UHF IF Input Coil	0Ω		312-5146-19				
L6	UHF IF Input Coil	0Ω		312-5146-16				
L7	Ant. Coils	0Ω		76-7610				Includes switch wafer with coils
L8	FIL. Choke	0Ω		32-4550-1				
L9	IF Trap	.1Ω		32-4548-13				
L10	Neutr. Coil	0Ω		312-5146-22				
L11	RF Coils	0Ω		76-7608				Includes switch wafer with coils
L12	Mixer grid coils	0Ω		76-7606				Includes switch wafer with coils
L13	FIL. Choke	0Ω		32-4550-1				
L14	Osc. Coils	0Ω		76-8604				Includes switch wafer with coils
L15	Feedback Coil	.9Ω		32-4551-1				
L16	RF Choke	0Ω		312-5146-8				
L17	RF Choke	.3Ω		312-5151-6				Wound on 12KΩ resistor
L18	IF Coupling Trans.	0Ω	0Ω	32-4599-2	17-4534 •			
L19	47.25MC Trap	.1Ω		32-4597-2	19-1000		4604	1. 2Microhenries
L20	41.25MC Trap	.6Ω		32-4112-31	19-1001		4604	1. 62Microhenries
L21	IF Coupling	.1Ω		32-4597-3	19-3001	TV-189	6175	.84 Microhenry
L22	FIL. Choke	.1Ω		32-4112-15	19-3001	TV-189	4606	2. 9 Microhenries
L23	1st Video IF	.1Ω	.1Ω	32-4598-5	20-1045		6219	
L24	FIL. Choke	.1Ω		32-4112-15	19-3001	TV-189	4606	2. 9 Microhenries
L25	2nd Video IF	.1Ω	.1Ω	32-4598-3	17-4523		6219	
L26	3rd Video IF	.1Ω	.1Ω	32-4548-26	17-4523		6219	
L27	4th Video IF	.1Ω	.1Ω	32-4548-27	17-4523		6219	
L28	Series Peak. Coil	8.2Ω		32-4432-37	19-1005		4612	10 Microhenries; IRC Part # CL-1
L29	Series Peak. Coil	.4Ω		32-4480-17	19-1002		4606	3 Microhenries
L30	Shunt Peak. Coil	4.8Ω		32-4480-9	19-3180	TV-184	6180	180 Microhenries
L31	Series Peak. Coil	8Ω		32-4480-18	19-3180	TV-184	4644	180 Microhenries
L32	4.5MC Trap	1.7Ω		32-4463-2	20-1004	TV-151	1470	
L33	Variable Shunt Peaking Coil	5.5Ω		32-4467-20				60-230 Microhenries
L34	Variable Shunt Peaking Coil	7Ω		32-4467-19				60-230 Microhenries
L35	Series Peak. Coil	2.1Ω		32-4480-1	19-3036	TV-180	6178	40 Microhenries
L36	1st Sound IF	4.3Ω		32-4463-9	17-3400	TV-151	1469	
L37	2nd Sound IF	2Ω	2Ω	32-4497A	19-3445	TV-113	6203	
L38	Ratio Det.	8.5Ω	.8ΩCT	32-4480-6A	17-3497	TV-115	6360	Tertiary winding- .8Ω
L39	FIL. Choke	.1Ω		32-4112-15	19-3007	TV-189	4606	2. 9 Microhenries
L40	Horiz. Osc.	170Ω		32-4557	19-1576	TV-163	6210	
L41	RF Choke	1.8Ω			19-1005		4624	15 Microhenries; Part of T3
L42	RF Choke	1.8Ω		32-4112-24	19-1005		4612	11.4 Microhenries
L43	RF Choke	1.8Ω		32-4112-24	19-1005		4612	11.4 Microhenries

• Drill mounting hole.

FILTER CHOKE

ITEM No.	RATINGS TOTAL CURRENT	RATINGS D C RESISTANCE	RATINGS INDUCTANCE @ CURRENT 1000 ^Cy	REPLACEMENT DATA PHILCO PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.
L44	.246ADC	37Ω	1 Hy.	Part of Spkr.	C-2326①	C-2996①	C-25X ①	C5037①	

① Drill one new mounting hole.

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DENVER, COLORADO

PARTS LIST AND DESCRIPTIONS (Continued)

SELENIUM RECTIFIER

ITEM No.	RATING	REPLACEMENT DATA					NOTES
	CURRENT	PHILCO PART No.	SELETRON PART No.	FEDERAL PART No.	MALLORY PART No.	SARKES TARZIAN PART No.	
M1	.280ADC	34-8003-7	5QS1	1023	6S350A	350A	
M2	.280ADC	34-8003-7	5QS1	1023	6S350A	350A	

FUSES

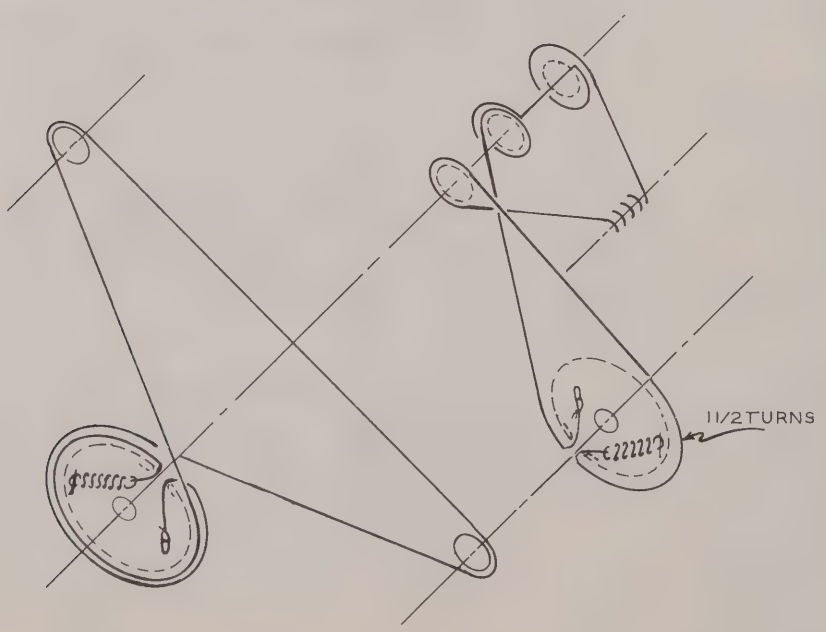
ITEM No.	TYPE	RATING	REPLACEMENT DATA					
			PHILCO PART No.		LITTELFUSE PART No.		BUSS PART No.	
			FUSE	HOLDER	FUSE	HOLDER	FUSE	HOLDER
M3	3AG S/B P/T	1.6A 125V	45-2656-23		31501.6 (3AG S/B P/T 1.6A)		MDV 1 6/10	
M4			Piece of #26 Wire 1" long.					

CRYSTAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA			NOTES
		PHILCO PART No.	SYLVANIA PART No.	FEDERAL PART No.	
M5	1N64	34-8022	1N132	1N64A	Video detector
M6		34-8026	1N82 or A		UHF Mixer

MISCELLANEOUS

ITEM No.	PART NAME	PHILCO PART No.	NOTES
M7	Dial Light	34-2068	VHF (Two added for UHF) #47 bayonet
M8	Tuner	43-6701	UHF adaptor UT20B
M9	Tuner	76-7600-3	VHF
M10	Switch	42-1996-6	UHF-VHF changeover
M11	Focus Magnet	76-6126-4	Includes centering device
M12	Ion Trap	76-6077-2	
M13	Correction Magnet		2 used
	Cabinet	10979-9 or-10	18B3104 & 18BU3104
	Cabinet	11015	22B4008, 22BU4008
	Cabinet	10993 or -1	22B4110, 22BU4110
	Cabinet	10993-2	22B4110L, 22BU4110L
	Cabinet	11016	22B4308, 22BU4308
	Cabinet	10997 or -1	22BU4108, 22B4108
	Knob	76-8457	Brightness and vertical hold
	Knob	76-8455	Channel Selector
	Knob	76-6048-5	Contrast and horizontal hold
	Knob	76-8456	Fine tuning
	Knob	76-6213-4	Tone
	Knob	76-8459	Off/on/volume
	Knob	76-8457-3	Brightness and vertical hold } For light finish cabinets
	Knob	76-8455-4	Channel Selector
	Knob	76-6048-6	Contrast and horizontal hold
	Knob	76-8459-1	Off/on/volume
	Knob	76-8508	UHF Selector
	Knob	54-8993	UHF dial background
	Safety glass	54-7943-57	3104 Models
	Safety glass	54-7943-62	4008 Models
	Safety glass	54-7943-56	4108 and 4308 Models
	Safety glass	54-7943-69	4110 Models



UHF DRIVE CORD STRINGING

TROUBLE SHOOTING AIDS (cont)

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POWER

DEAD SET

If filaments fail to light, check fuse M4, AC interlock assembly, switch on volume control and T1. If filaments light, check M1, M2, M3, C1, C2, C4A and other associated components.

SMALL AND/OR DIM PICTURE

Measure B+ at 240V point.

If Satisfactory	If Unsatisfactory
Proceed as outlined under "Insufficient High Voltage".	Check M1, M2, C1, C2, C4A and other associated components.

HIGH VOLTAGE

LOSS OF HIGH VOLTAGE

Check by substitution V18, V19, V20 and V21. Check waveform W18.

If Satisfactory	If Unsatisfactory
Check R126, T3, T5A, C112, R120, R4 and other associated components.	Check R119, R114, R111, C109, C111 and other associated components.

INSUFFICIENT HIGH VOLTAGE

Check by substitution V18, V19, V20 and V21. Check picture tube. Proceed as outlined under "Loss of High Voltage".

BLOOMING

Check by substitution V18, V19, V20 and V21. Check R126, T3, T5A, C112, R120, R4 and other associated circuit components.

GENERAL

RASTER SOUND NO PICTURE

Follow procedure outlined under "Loss of Video".

RASTER PICTURE NO SOUND

Follow procedure outlined under "Weak or No Sound".

RASTER NO SOUND NO PICTURE

Check by substitution V1, V2, V3, V4, V5, and V6. Check video detector assembly. Check video IF and tuner components.

NO RASTER NO SOUND

Follow procedure outlined under "Dead Set".

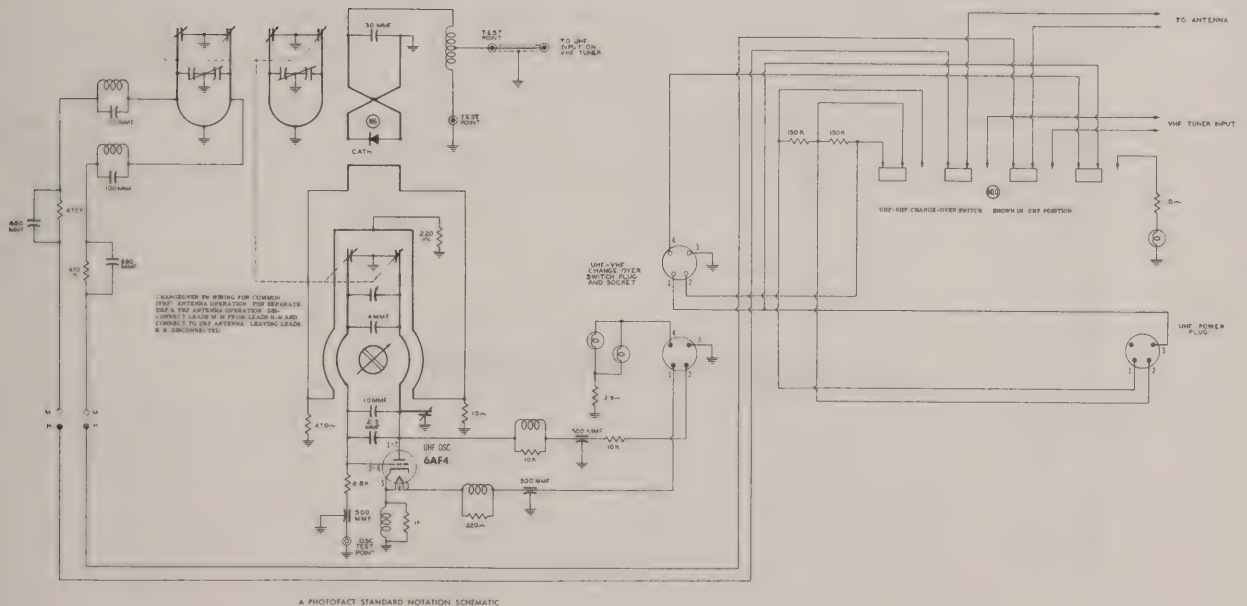
KEYSTONE EFFECT

Check T5, C116, R124, R104, and R105.

INTERMITTENT STREAKS

Check high voltage section for corona discharge and arcing.

Symptoms shown are assumed and are not indicative of the quality and workmanship of this equipment.



A PHOTOFACT STANDARD NOTATION SCHEMATIC

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UHF TUNER SCHEMATIC

SERVICING IN THE FIELD

TUNER OSCILLATOR ADJUSTMENTS

Touch-up adjustments of the VHF tuner oscillator circuit may be accomplished by removing the channel selector and fine tuning knobs.

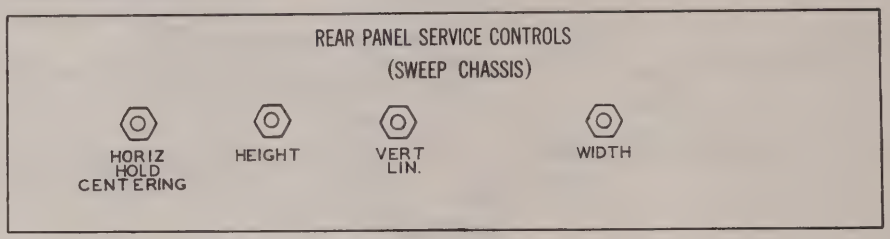
PICTURE TUBE SAFETY GLASS CLEANING

To clean safety glass remove 3 wood screws holding wood strip at bottom of safety glass. Remove wood strip and safety glass. Use extreme caution when removing safety glass.

PICTURE TUBE REMOVAL

For picture tube removal it is necessary tor remove chassis. (See disassembly instructions).

SERVICE ADJUSTMENT LOCATION



HORIZONTAL OSCILLATOR FIELD ADJUSTMENT

Adjustment of the horizontal oscillator circuit can be made from the rear panel of the chassis. Set the horizontal hold control at the mid-position of its range and adjust the horizontal hold centering control until picture synchronizes horizontally. If results are unsatisfactory, see horizontal sweep circuit adjustments on page 11.

SOUND IF DETECTOR BUZZ ADJUSTMENT

To eliminate sound IF detector buzz, adjust the ratio detector secondary (L38) located on top of chassis. (See tube placement chart).

FUSES

Two fuses are used. One for LV power supply protection and one for filament protection. (For location, see tube placement chart).

CENTERING

Centering is accomplished mechanically by means of a centering lever on the PM focusing assembly. Adjust the centering lever from side to side and up and down until the picture is properly centered.

BUILT-IN ANTENNA TUNING

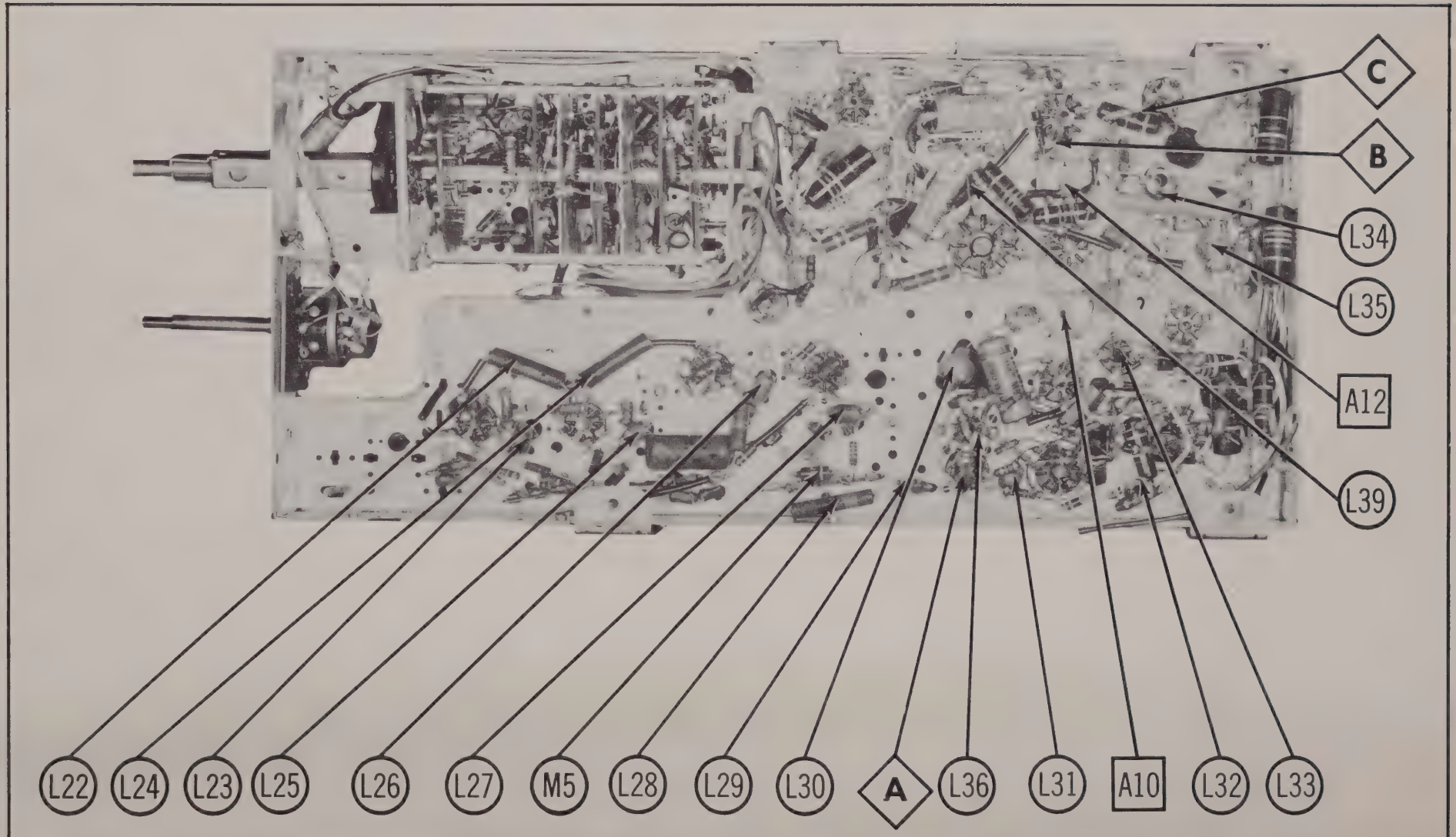
The built-in antenna can be adjusted from top rear of cabinet. Adjust for a picture of maximum contrast and minimum ghost.

ANTI-PIN CUSHION ADJUSTMENTS

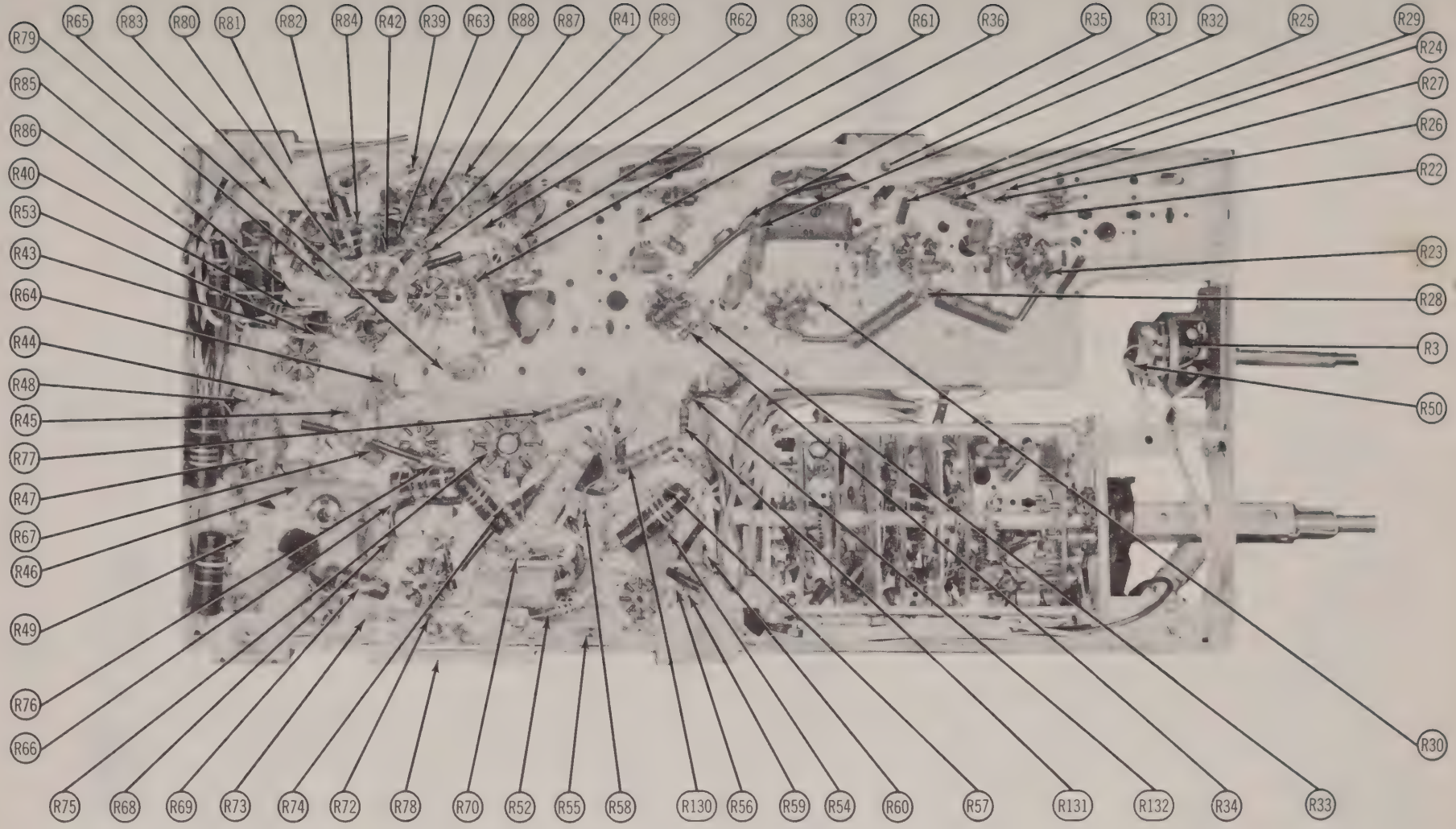
Reduce the picture size so that the sides of the raster are visible, and position the magnets so that all sides are straight lines and the coreners are at right angles.

DISASSEMBLY INSTRUCTIONS

1. Remove 9 push on type control knobs from front panel.
2. Disconnect built-in antenna and transmission line.
3. Remove 10 wood screws. Remove rear cover.
4. Disconnect speaker plug, CRT socket, HV plug, inter-chassis plugs and yoke plug.
5. Remove 4 chassis bolts from each chassis. Remove both chassis.
6. Remove 4 speaker nuts. Remove speaker.



RF-IF CHASSIS-BOTTOM VIEW- INDUCTOR AND ALIGNMENT IDENTIFICATION



RF-IF CHASSIS-BOTTOM VIEW-RESISTOR IDENTIFICATION

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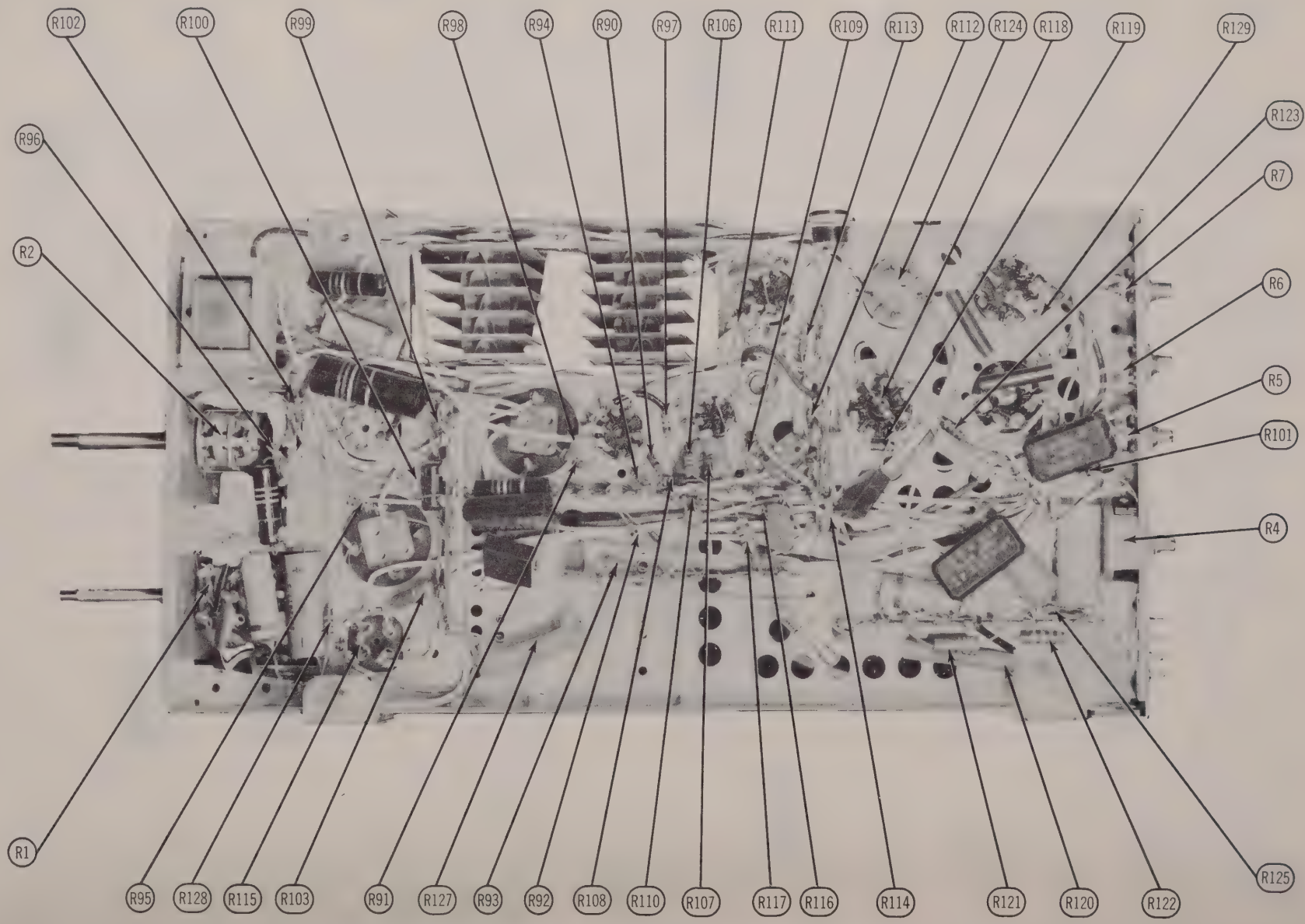

SWEEP CHASSIS BOTTOM VIEW-RESISTOR IDENTIFICATION

PHOTOFACT* Folder

WESTINGHOUSE MODELS H-795T27, H-795TU27, H-815T24, H-815TU24, H-817K24, H-817KU24 (Ch. V-2250-1)

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MODEL H-815T24

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DATE 6-54 SET 241 FOLDER 12

PHOTOFACT* Folder

WESTINGHOUSE MODELS H-795T27, H-815TU24, H-795TU27, H-815T24, H-817K24, H-817KU24 (Ch. V-2250-1)

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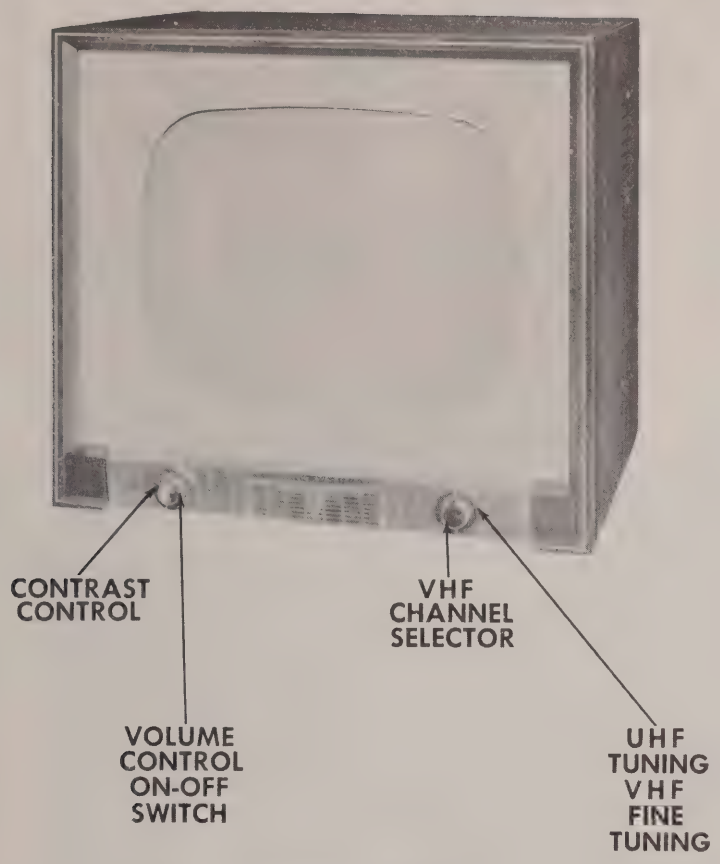

WESTINGHOUSE MODEL H-815T24

TRADE NAME	Westinghouse Models H-795T27, H-795TU27, H-815T24, H-815TU24, H-817K24, H-817KU24 (Ch. V-2250-1)
MANUFACTURER	Westinghouse Electric Corp., Television & Radio Div., Metuchen, N.J.
TYPE SET	Television Receiver
TUBES	Twenty-four
POWER SUPPLY	110-120 Volts AC-60 Cycles RATING 2.56 Amp. @ 117 Volts AC
TUNING RANGE	Channels 2 thru 13 VHF, 14 thru 83 UHF, Video IF 45.75MC, Sound IF 41.25MC (Intercarrier)

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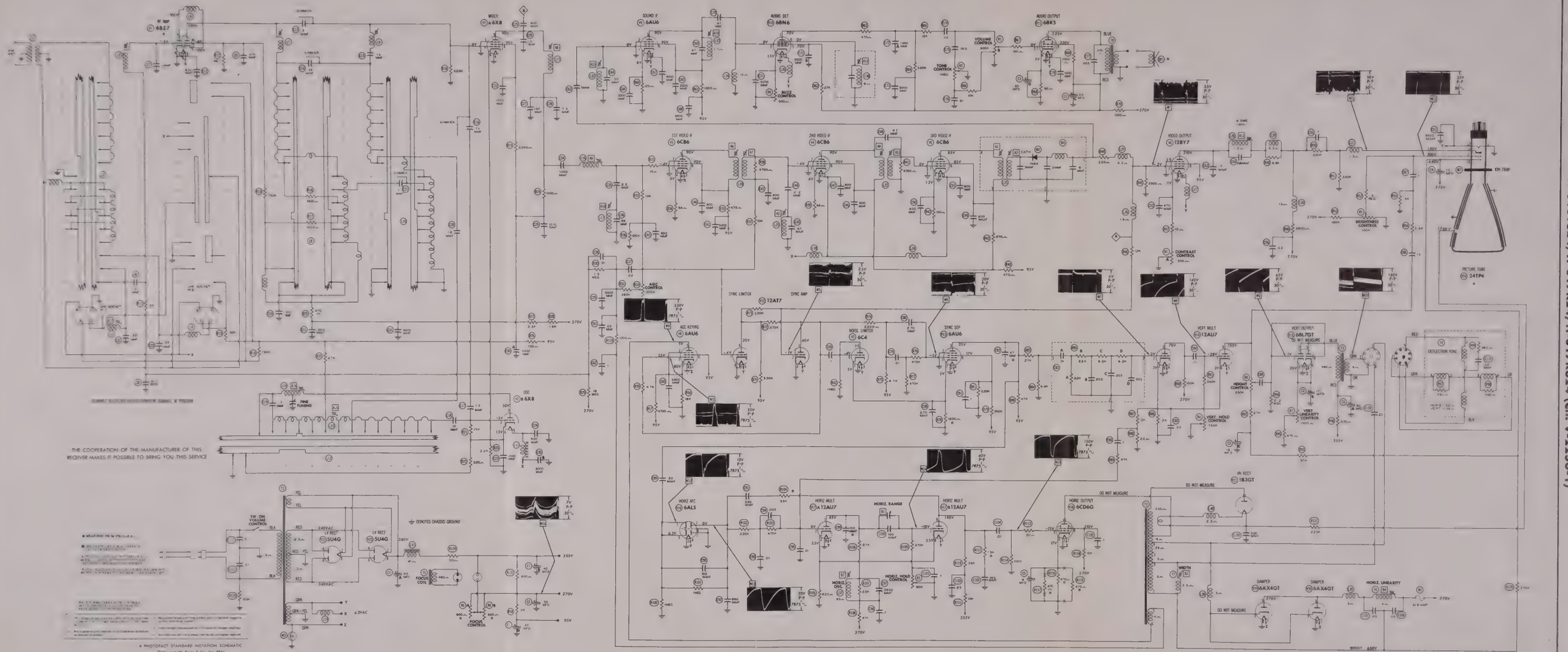
DATE 6-54 SET 241 FOLDER 12

WESTINGHOUSE MODELS H-795T27, H-795TU27, H-815T24, H-815TU24, H-817K24, H-817KU24 (Ch. V-2250-1)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A PHOTOFACT STANDARD NOTATION SCHEMATIC
© Howard W. Sams & Co., Inc. 1954
DENOTES CHASSIS GROUND
WESTINGHOUSE MODELS H-795T27, H-795TU27, H-815T24, H-815TU24, H-817K24, H-817KU24 (Ch. V-2250-1)

WESTINGHOUSE MODELS H-795T27, H-795TU27, H-815T24, H-815TU24, H-817K24, H-817KU24 (Ch. V-2250-1)

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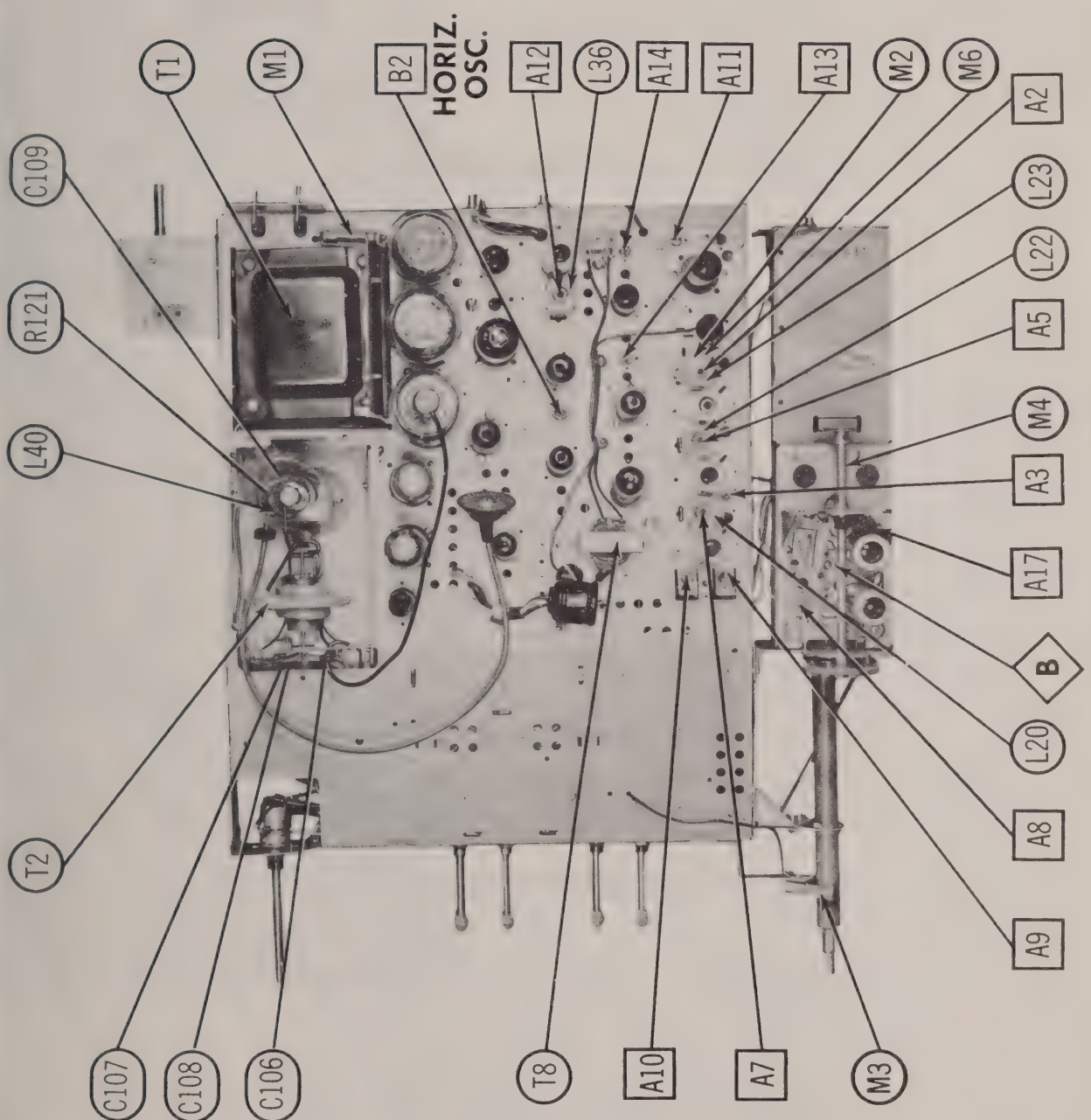
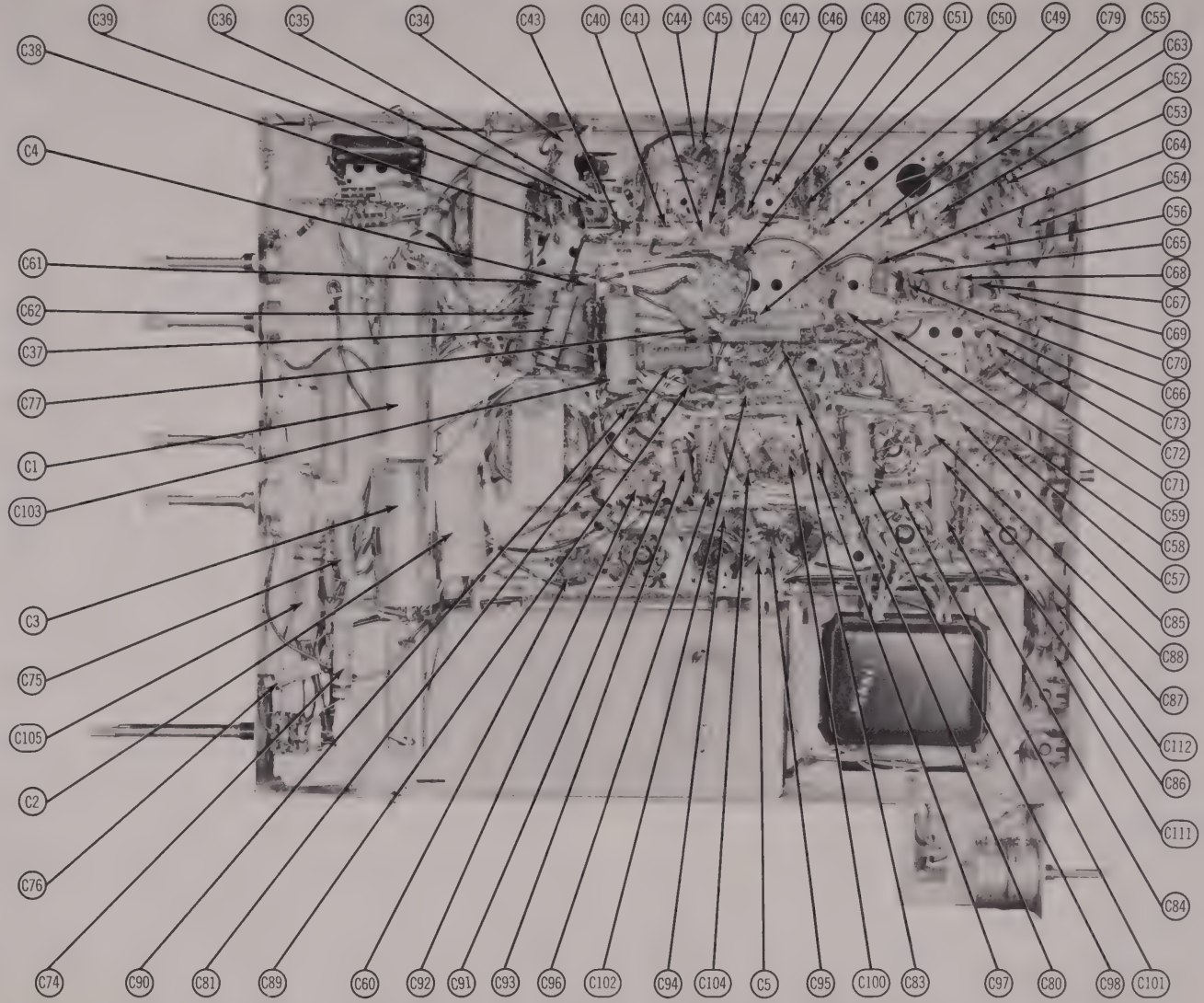
DENVER, COLORADO



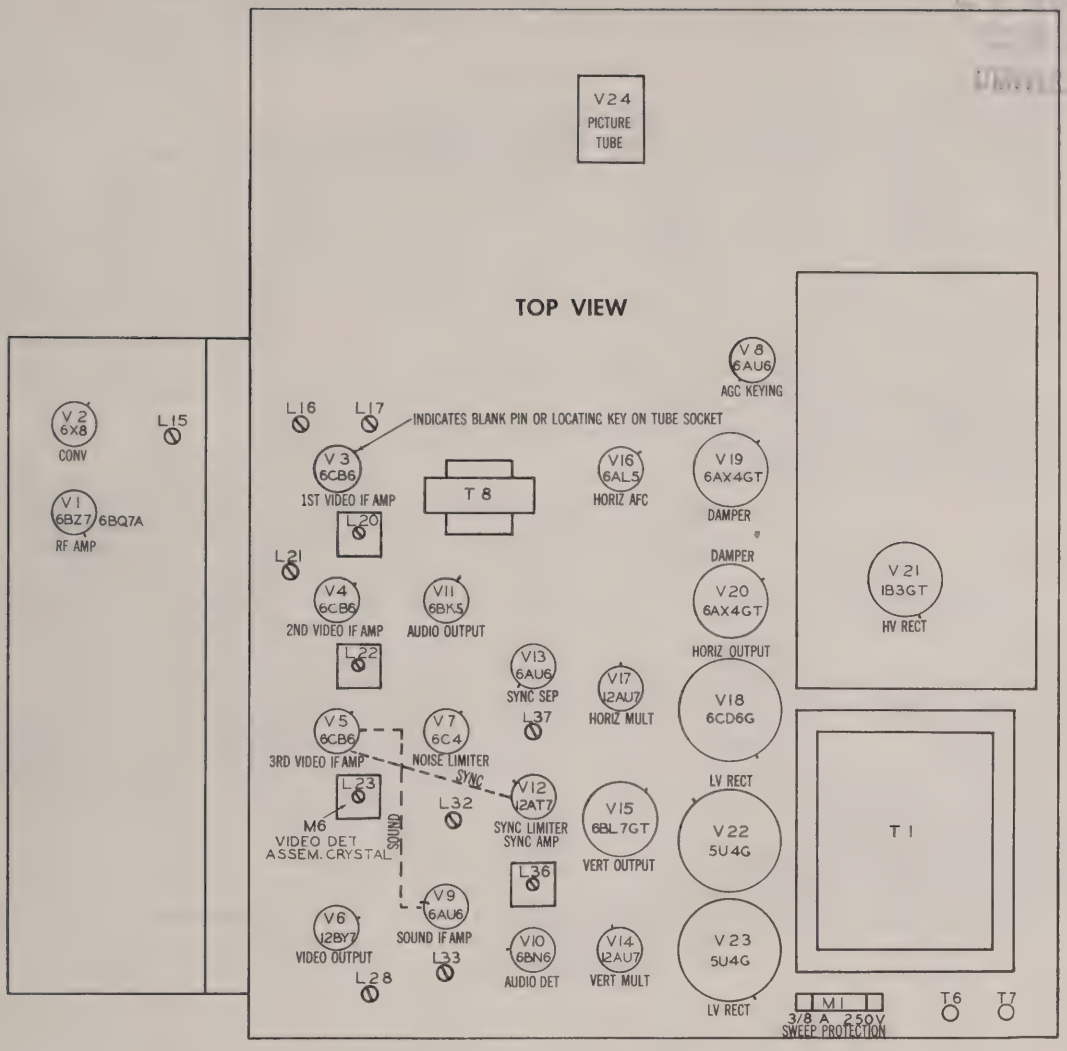
CHASSIS TOP VIEW

WESTINGHOUSE MODELS H-795T27, H-795TU27, H-815T24, H-815TU24, H-817K24, H-817KU24 (Ch. V-2250-1)



CHASSIS BOTTOM VIEW-CAPACITOR IDENTIFICATION

TUBE PLACEMENT CHART



TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce the indicated symptoms. Refer to tube placement chart for location and type of tube.

POWER SUPPLY FAILURE
No raster, no sound - **V22, V23**

LOSS OF PICTURE OR SOUND
No pic, no sound, has raster - **V2, V3, V4, V5**
No pic, no sound, has snow - **V1, V2, V3**
No pic, has sound, has raster - **V6, V24**
Has pic, no sound - **V9, V10, V11**
Overloaded picture - **V8**

SYNC FAILURE
No vert. sync - **V13, V14**
No horiz. sync - **V13, V16, V17**
No vert. or horiz. sync - **V12, V13**

SWEEP FAILURE
No raster, has sound - **V17, V18, V19, V20, V21, V24, Fuse (M1)**
No vertical deflection - **V14, V15**
Poor vert. linearity or foldover - **V14, V15**
Poor horiz. linearity or foldover - **V17, V18, V19, V20**
Narrow picture - **V17, V18, V19, V20, V21, V22, V23**
Vert. off freq. - **V13, V14**
Horiz. off freq. - **V13, V16, V17**

PROPERTY OF
T. V. WORKSHOP
[illegible] AVE. ST.
DENVER, COLORADO

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

The high voltage lead should be securely taped and kept away from the chassis. Do not remove the horizontal multivibrator tube (V17) to disable the high voltage.

VIDEO IF ALIGNMENT

Remove the RF amplifier (V1) from its socket.
Connect a 470MMF capacitor across the vertical input terminals of scope.
Connect the negative lead of a 9 volt bias supply to the ungrounded side of C39. Connect positive lead to chassis.
Set scope gain to maximum and use only enough sweep generator output to produce a useable pattern on scope.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	Direct	High side to pin 1 (grid) of 6CB6 (V5). Low side to chassis. Use short leads.	44MC (10MC Swp)	41.25MC 42.25MC 43.0MC 44.0MC 45.0MC 45.75MC 47.25MC	13	Vert. Amp. thru 47KΩ to point (A). Low side to chassis.	A1, A2	Connect alligator clip to pin 5 (plate) of V3 and V4 to detune these plate circuits. EXERCISE CARE TO AVOID SHOCK. Adjust A1 for maximum amplitude at 44MC. Adjust A2 for symmetrical response centered about 44MC as in Fig. 1. Remove detuning clips from plates of V3 and V4.
2.	"	High side to pin 1 (grid) of 6CB6 (V3). Low side to chassis.	Not used	47.25MC (400∿Mod)	"	"	A3	Adjust for MINIMUM 400∿ indication on scope.
3.	"	High side to pin 1 (grid) of 6CB6 (V4). Low side to chassis. Use short leads.	44MC (10MC Swp)	41.25MC 42.25MC 43.0MC 44.0MC 45.0MC 45.75MC 47.25MC	"	"	A4, A5	Connect alligator clip to pin 5 (plate) of V3 to detune plate circuit. Adjust A4 for maximum amplitude at 44MC. Adjust A5 for symmetrical response centered about 44MC as in Fig. 2. Retouch A4 and A5 alternately to obtain desired response. Remove alligator clip from pin 5 of V3.
4.	"	High side to pin 1 (grid) of V3. Low side to chassis. Use short leads	"	"	"	"	A6, A7, A8	Detune A8 several turns counter clockwise. Adjust A6 for maximum amplitude at 44MC. Adjust A7 for symmetrical response centered about 44MC as in Fig. 3. Adjust A8 so that dip in response is at 44MC. Replace RF amplifier (V1) in its socket.
5.	Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead.	213MC (10MC Swp)	"	"	"	A9, A10	Couple marker generator to ungrounded tube shield over converter tube (V2). Adjust A9 for symmetrical response. Adjust A10 for MINIMUM marker amplitude at 41.25MC. Check overall response for curve similar to Fig. 4.

4.5MC TRAP ALIGNMENT

Short antenna terminals to chassis.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
6.	.001MFD	High side to point (A). Low side to chassis.	4.5MC (Unmod)	Any non-interfering channel	DC probe thru detector (Fig. 5) to pin 11 of picture tube. Low side to chassis.	All	Adjust for MINIMUM deflection.

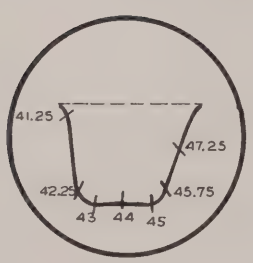


FIG. 1

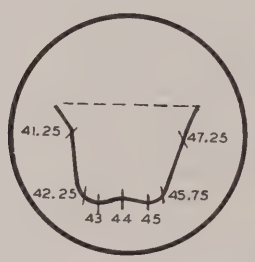


FIG. 2

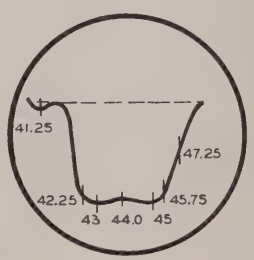


FIG. 3

ALIGNMENT INSTRUCTIONS (cont)

PROPERTY OF
L. F. BLANKENSHIP
[illegible] MEADE ST.
DENVER, COLORADO

SOUND IF ALIGNMENT

Tune in the strongest TV signal available.
Connect an attenuator between receiver and antenna terminals so that the signal strength may be varied from weak to strong.
Set the quieting control (R9) to its mid-range position.
With strong signal applied to receiver adjust A12 for maximum volume. Should two peaks occur use the one obtained when A12 is farthest counter clockwise. Two peaks occurring within a narrow range indicates insufficient signal input or that R9 should be repositioned slightly.
Attenuate the signal input to its lowest useable level and adjust A13, A14 and A15 for maximum volume.
Attenuate signal input until noise is heard and readjust R9 for minimum noise.

SOUND IF ALIGNMENT USING FM SIGNAL GENERATOR AND OUTPUT METER

If desirable an oscilloscope may be substituted for the output meter.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	OUTPUT METER	ADJUST	REMARKS
7.	.001MFD	High side to point (A). Low side to chassis.	4.5MC (15KC Swp)	Any non-interfering channel	Across volume control (R18)	A12	Adjust for maximum output. (Use strong signal input).
8.	"	"	"	"	"	A13, A14	Attenuate signal generator output to lowest level that will produce a useable indication on output meter. Adjust for maximum output. Also, readjust A12 for maximum output.
9.	"	"	Use AM Signal Gen. 4.5MC (400~Mod)	"	"		Gradually increase generator output while simultaneously turning R9 back and forth until signal level reaches a point where the deflection on output meter dips to zero with a rise on either side as R9 is rotated back and forth. Set R9 for zero output at this signal level.

OSCILLATOR ALIGNMENT

1. Set fine tuning control to its mid-range position (arrow near edge of fine tuning drive wheel straight up).
2. Tune in a TV station operating on the highest low band channel (channels 2 to 6) available and adjust A15 for clearest picture.
3. Tune in a TV station operating on the highest high band channel (channels 7 to 13) available and adjust A16 for clearest picture.
4. Repeat steps 2 and 3.

RF AND MIXER ALIGNMENT

The RF and mixer portion of this receiver has been properly aligned at the factory and is very stable. Alignment of this portion of the receiver should not be required in the field.

UHF TUNER ALIGNMENT

Connect the 9 volt bias supply as under "Video IF Alignment". Set channel selector switch to "UHF" position.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
10.	Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead.	677MC (10MC Swp)	43MC	48	Vert. Amp. thru detector probe (Fig. 6) to point (B). Low side to chassis.	A17, A18	Couple VHF marker generator loosely to point (B). Adjust VHF fine tuning control until the response curve appears on scope. Attenuate marker generator output so that 43MC marker is just visible on scope. Simultaneously adjust A17 (on VHF tuner) and R18 until response is symmetrical centered about the 43MC marker as in Fig. 7.

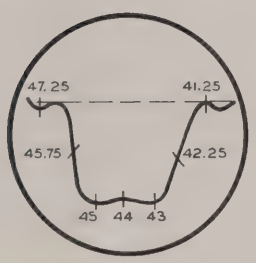


FIG. 4

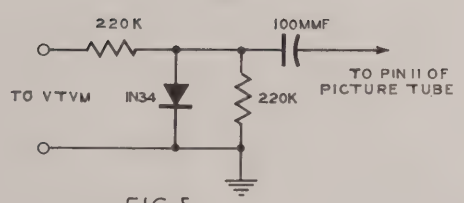


FIG. 5

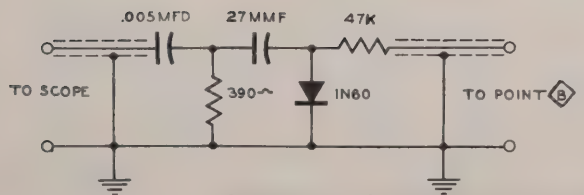


FIG. 6

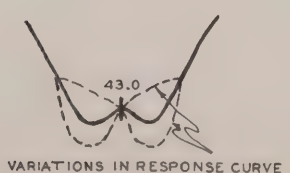
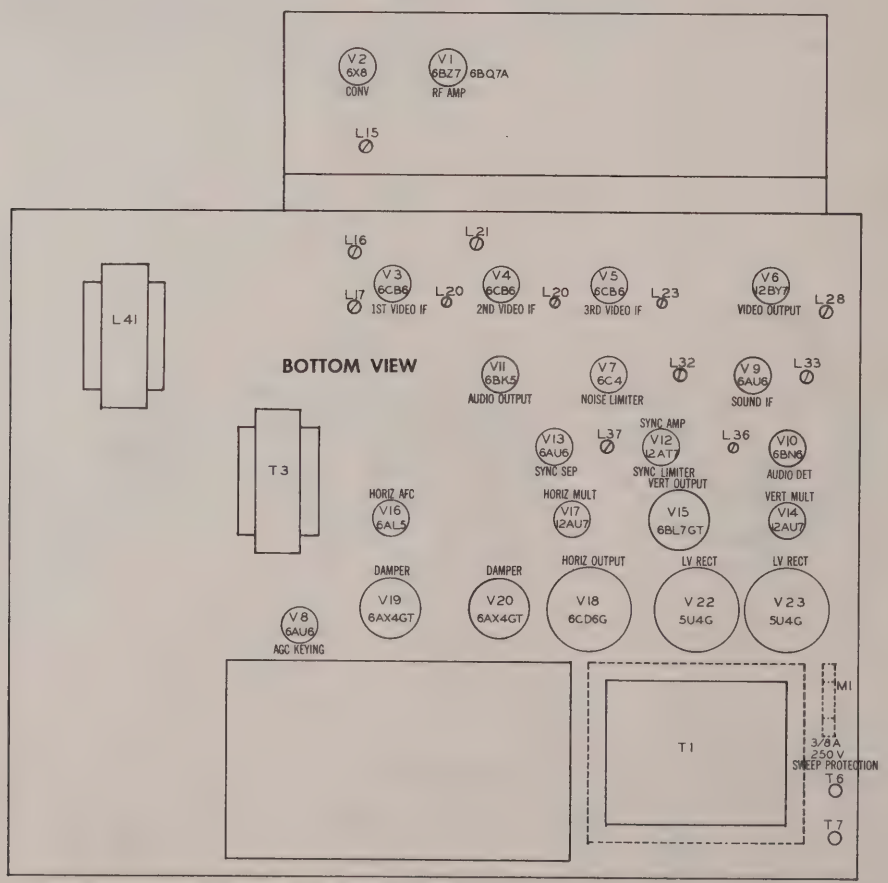


FIG. 7

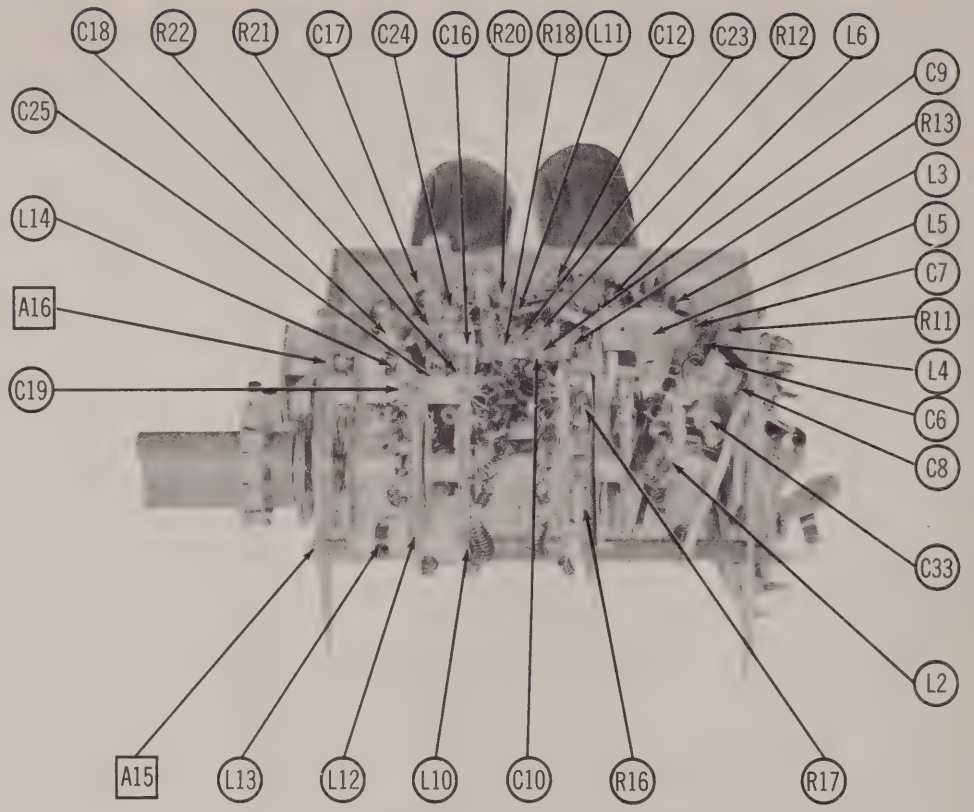
RESISTANCE MEASUREMENTS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6BZ7	† 5KΩ	700KΩ	INF	.1Ω	0Ω	INF	2 Meg	0Ω	0Ω
V 2	6X8	0Ω	15KΩ	† 8.3KΩ	0Ω	.1Ω	220Ω	220KΩ	† 7.7KΩ	† 6.6KΩ
V 3	6CB6	110KΩ	68Ω	.1Ω	0Ω	† 4KΩ	† 4KΩ	0Ω		
V 4	6CB6	110KΩ	68Ω	.1Ω	0Ω	† 4KΩ	† 4KΩ	0Ω		
V 5	6CB6	.5Ω	150Ω	.1Ω	0Ω	† 4.5KΩ	† 4.5KΩ	0Ω		
V 6	12BY7	58Ω	3.3Ω	0Ω	.1Ω	.1Ω	0Ω	† 4.3KΩ	† 3.4KΩ	0Ω
V 7	6C4	1 Meg	INF	.1Ω	0Ω	1 Meg	1 Meg	1.2KΩ		
V 8	6AU6	† 14KΩ	† 7.8KΩ	.1Ω	0Ω	560KΩ	† 3.4KΩ	† 7.8KΩ		
V 9	6AU6	.4Ω	0Ω	0Ω	.1Ω	† 4.4KΩ	† 4.4KΩ	120Ω		
V 10	6BN6	220Ω	15Ω	.1Ω	0Ω	† 28.5KΩ	6Ω	† 330KΩ		
V 11	6BK5	† 1.8KΩ	500KΩ	500KΩ	.1Ω	0Ω	180Ω	500KΩ	† 2.4KΩ	INF
V 12	12AT7	† 5.6KΩ	15.3KΩ	0Ω	.1Ω	.1Ω	† 110KΩ	100KΩ	0Ω	0Ω
V 13	6AU6	1 Meg	0Ω	0Ω	.1Ω	† 50KΩ	160KΩ	1.2KΩ		
V 14	12AU7	† 100KΩ	60KΩ	1.2KΩ	.1Ω	.1Ω	▲ 700KΩ	850KΩ	1.2KΩ	0Ω
V 15	6BL7GT	2.2Meg	† 1.5KΩ	840Ω	2.2Meg	† 1.5KΩ	840Ω	0Ω	.1Ω	
V 16	6AL5	1 Meg	0Ω	0Ω	.1Ω	1 Meg	0Ω	0Ω		
V 17	12AU7	† 75KΩ	2.7 Meg	820Ω	.1Ω	.1Ω	† 95KΩ	320KΩ	820Ω	0Ω
V 18	6CD6G	INF	.1Ω	160Ω	INF	100KΩ	INF	0Ω	† 10K	TOP CAP ▲ 22Ω
V 19	6AX4GT	▲ 3Ω	INF	2 Meg	INF	† 400Ω	INF	.1Ω	0Ω	
V 20	6AX4GT	INF	INF	2 Meg	INF	† 400Ω	INF	.1Ω	0Ω	
V 21	1B3GT	PINS 1-8 HAVE INF. RESISTANCE								TOP CAP ▲ 550Ω
V 22	5U4G	INF	17KΩ	INF	12Ω	22Ω	12Ω	INF	17KΩ	
V 23	5U4G	INF	17KΩ	INF	12Ω	INF	12Ω	INF	17KΩ	
V 24	24TP4	0Ω	† 1.7Meg	PIN 10 ▲ 270KΩ	PIN 11 † 180KΩ	PIN 12 .1Ω				

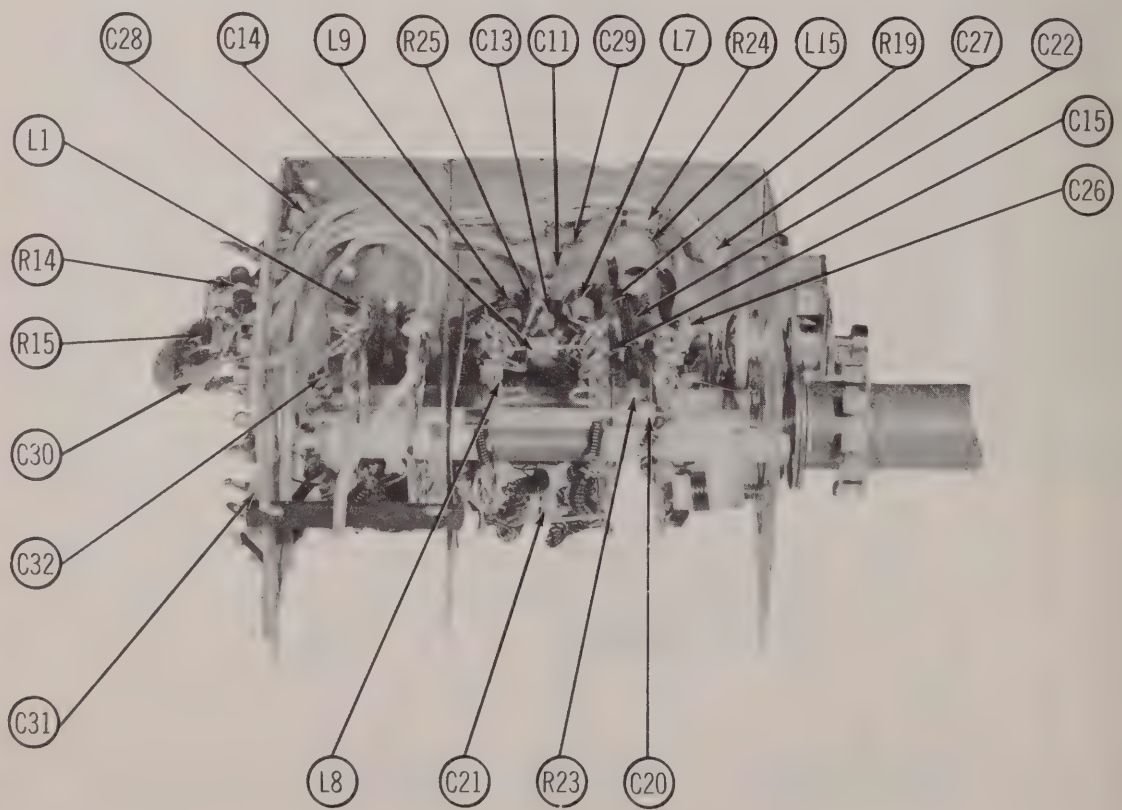
† MEASURED FROM PIN 8 of V23.
▲ MEASURED FROM PIN 3 OF V19.



TUBE PLACEMENT CHART



VHF TUNER-RIGHT SIDE



VHF TUNER-LEFT SIDE

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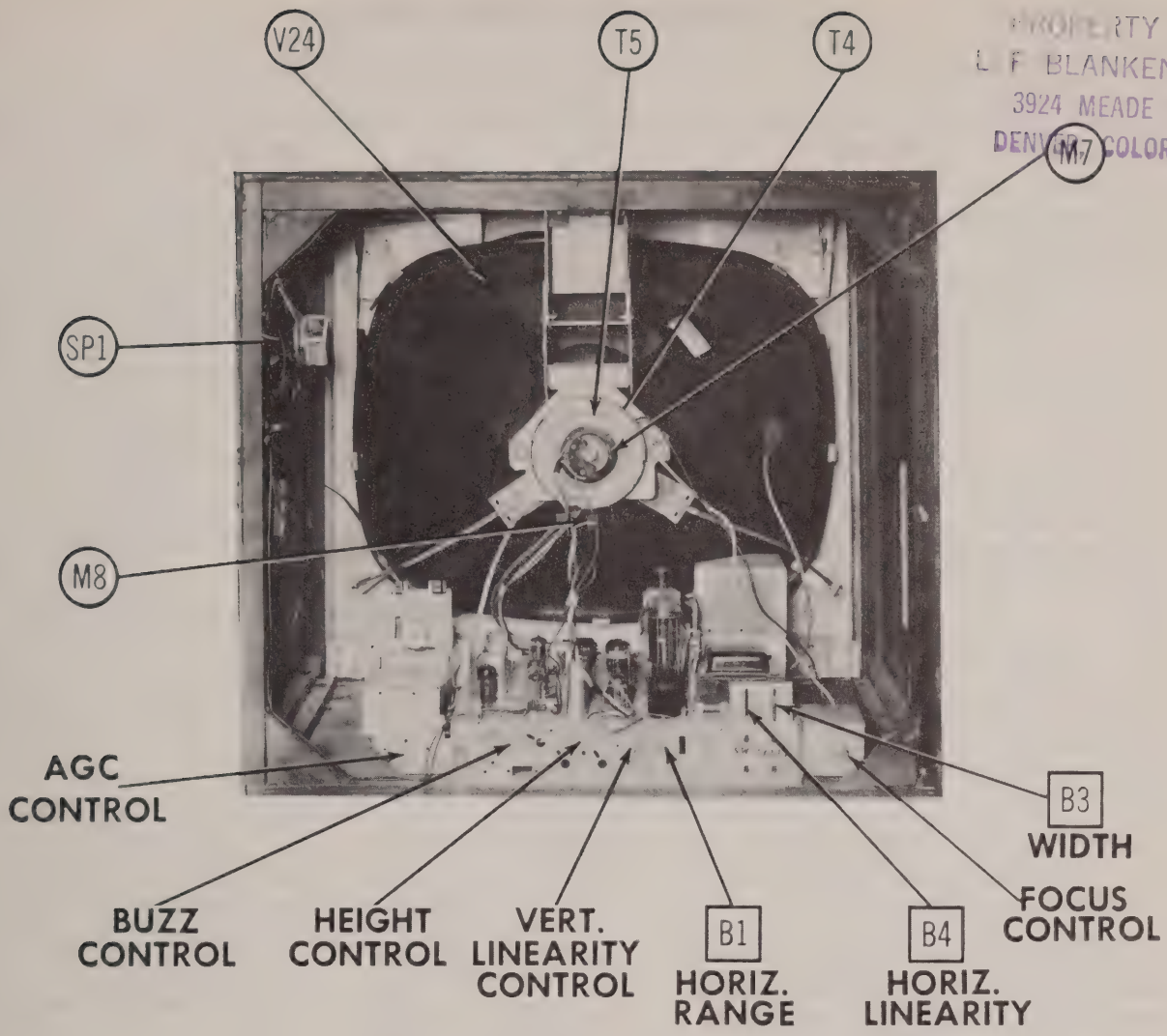
DENVER, COLORADO



CABINET—REAR VIEW

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Turn the set on and tune in a TV station, preferably a test pattern.

1. Set the horizontal hold control to its mid-range position.
2. Connect a short jumper across the horizontal oscillator coil, L37.
3. Connect the DC probe of VTVM to pin 2 (grid) of V17. Adjust the horizontal range trimmer (B1) for + 1 volt on VTVM. If necessary readjust horizontal hold control slightly to obtain a 1 volt reading on VTVM.
4. Remove jumper across L37 and adjust horizontal oscillator slug (B2) for + 1 volt on VTVM. Check pull-in by switching on and off channel. If picture does not pull into sync on all channels repeat above procedure until proper pull-in is obtained.

Adjust the horizontal width slug (B3) for a picture slightly wider than necessary to fill the picture mask horizontally.

Adjust the horizontal linearity slug (B4) for a picture that is symmetrical from left to right.

TROUBLE SHOOTING AIDS

SWEEP

HORIZONTAL

LOSS OF SWEEP

Follow procedure outlined under "Loss of High Voltage".

INSUFFICIENT SWEEP

Check by substitution V17, V18, V19, V20, V22 and V23. Check adjustments B3 and B4. Check waveform W15.

If Satisfactory	If Unsatisfactory
Check C105, C108, C106, C107, R118, T2, T4A and other associated components.	Check C100, C104, C102, R110, R111, R114 and other associated components.

DRIVE LINES

Check by substitution V17, V18, V19 and V20. Check C102, C104, R112, R114, C106, C107, C110, T2, T4A and other associated components for f allure or change of value.

COMPRESSED LEFT SIDE

Check by substitution V17, V18, V19 and V20. Check components associated with the horizontal output and damper stages especially T2 and T4A for failure or change of value.

FOLDS

Follow procedure outlined under "Drive Lines".

PIE CRUST EFFECT

Check C95 for open. Check V18, V19 and V20 for internal arcing.

XMAS TREE EFFECT

Substitute V17. Check C97, C99, C100 and L37. Check other associated components.

VERTICAL

LOSS OF SWEEP

Check by substitution V14 and V15. Check waveform W9.

If Satisfactory	If Unsatisfactory
Check T3, T4B, R7, R95 and other associated circuit components.	Check R92, R94, R8, C88 and other associated circuit components.

INSUFFICIENT SWEEP

Check adjustment of height and vertical linearity controls. Proceed as outlined under "Loss of Sweep".

COMPRESSED AT BOTTOM

Check by substitution V14 and V15. Check T3, T4B, C3B and other associated circuit components.

COMPRESSED AT TOP

Check by substitution V14 and V15. Check C88, R94 and other associated components for failure or change of value.

FOLDS

Check by substitution V14 and V15. Check associated components including T3, T4B and C3B.

SYNC

LOSS OF HORIZONTAL AND VERTICAL SYNC

Check by substitution V7, V12 and V13. Check components associated with these stages especially C59, C79, R77, R76, R72, R82, R79 and R80.

LOSS OF VERTICAL SYNC-HORIZONTAL SYNC SATISFACTORY

Check by substitution V7, V12, V13 and V14. Check waveform W7.

If Satisfactory	If Unsatisfactory
Check components associated with V14.	Check vertical integrator and other associated circuit components. Check video and IF stages for overloading.

LOSS OF HORIZONTAL SYNC-VERTICAL SYNC SATISFACTORY

Check by substitution V16 and V17. Check waveform W12.

If Satisfactory	If Unsatisfactory
Check components associated with V17.	Check components associated with V16.

HORIZONTAL BENDING

Check by substitution V16, V17 and V18. Check the ho rizontal AFC filter network for component failure or change of value.

VIDEO

LOSS OF VIDEO

Substitute V6. Check peaking coils, plate load resistors, coupling capacitors and other associated components check picture tube.

SOUND BARS (4.5MC BEAT)

Adjust tuner fine tuning for best picture and sound. Check adjustment A11. Check video IF alignment .

POOR CONTRAST

Check by substitution V6. Check video detector crystal and assembly. Check contrast control, picture tube and other associated components.

NEGATIVE PICTURE

Check by substitution V6, V8, V4, V3, and V1. Check adjustment of the AGC control. Check AGC network components. Check picture tube, video detector assembly and other associated components.

SMEAR

Check by substitution V6, V5, V4, and V3. Check video detector assembly. Check C55, R45, R49, R51, L29, L30, L31, picture tube and other associated components.

WIDE BLACK BAR ACROSS PICTURE

Check V1, V2, V3, V4, V5 and V6 for heater to cathode leakage.

AUDIO

WEAK OR NO SOUND

Check by substitution V9, V10 and V11. Check audio IF and detector alignment and components. Check C74, C77, C72, volume control, speaker, T8 and other associated components.

BUZZ

Check adjustment of the buzz control. Check audio IF and detector alignment. Check AGC for proper operation.

DISTORTED

Follow procedure outlined under "Weak or No Sound".

PARTS LIST AND DESCRIPTIONS

PROPERTY OF
L. F. RAINEYSHIP
DENVER, COLORADO

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA		RETMA BASE TYPE	NOTES
		Westinghouse PART No.	STANDARD REPLACEMENT		
V1A	RF Amplifier	6BZ7	6BZ7	9AJ	
B	RF Amplifier	6BQ7A	6BQ7A	9AJ	
V2	Converter	6X8	6X8	9AK	
V3	1st. Video IF Amp.	6CB6	6CB6	7CM	
V4	2nd. Video IF Amp.	6CB6	6CB6	7CM	
V5	3rd. Video IF Amp.	6CB6	6CB6	7CM	
V6	Video Output	12BY7	12BY7	9BF	
V7	Noise Limiter	6C4	6C4	6BG	
V8	AGC Keying	6AU6	6AU6	7BK	
V9	Sound IF Amp.	6AU6	6AU6	7BK	
V10	Audio Det.	6BN6	6BN6	7DF	
V11	Audio Output	6BK5	6BK5	7BT	
V12	Sync Limiter-Sync Amplifier	12AT7	12AT7	9A	
V13	Sync Separator	6AU6	6AU6	7BK	
V14	Vert. Mult.	12AU7	12AU7	9A	
V15	Vert. Output	6BL7GT	6BL7GT	8BD	
V16	Horiz. AFC	6AL5	6AL5	6BT	
V17	Horiz. Mult.	12AU7	12AU7	9A	
V18	Horiz. Output	6CD6G	6CD6G	5BT	
V19	Damper	6AX4GT	6AX4GT	4CG	
V20	Damper	6AX4GT	6AX4GT	4CG	
V21	HV Rectifier	1B3GT	1B3GT	3C	
V22	LV Rectifier	5U4G	5U4G	5T	
V23	LV Rectifier	5U4G	5U4G	5T	

CATHODE-RAY TUBE

ITEM No.	REPLACEMENT DATA				RETMA BASE TYPE	NOTES
	WESTINGHOUSE PART No.	SYLVANIA PART No.	GENERAL ELECTRIC PART No.	WESTINGHOUSE PART No.		
V24A	24TP4				12N	
B	27MP4				12N	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	Westinghouse PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C1A	▲40	450	V-9891-1	E4D320		D092		FP428.4	TVL-4720	
B	■40	450								
C	▲30	350								
D	30	350								
C2	30	450	V-6570	PRS450/30		BR3045		TC77	TVA-1711	
C3A	▲30	500	V-11535-1	E4D584		D113			R1373	
B	▲150	50								
C	■10	450								
D	30	50								
C4	10	450	V-10293-1	PRS500/10		BR1045		TC72	TVA-1705	
C5	4	50	V-4637	PRS150/4		BR550		TC30	TVA-1303	
C6	15			SI15	D6-150	TP11	GP1K-150	UC-5415	5GA-Q15	
C7	3			SI3NP0	TCZ-3	TZ06	NP0K-030	ZT-5533	5TCCB-V33	
C8	800			BPD-0008	DD-801	K069	801-001	DC-521	5HK-D1	
C9	470			BPD-00047	D6-471	K060	817-471	UC-5347	5GA-T47	
C10	1000			EF-001	MFT-1000				503C-D1	
C11	1000			BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C12	800			BPD-0008	DD-801	K069	801-001	DC-521	5HK-D1	
C13	.3									
C14	.56									
C15	15			SI15	D6-150	TP11	GP1K-150	UC-5415	5GA-Q15	
C16	.75									
C17	1.5									
C18	10			SI10NP0	TCZ-10	TZ09	NP0K-100	ZT-541	5TCC-Q1	
C19	1.5			SI1.5NP0	TCZ-1.5	TZ04	NP0K-1R5	ZT-5515	5TCCB-V15	
C20	1.6									
C21	1			SI1NP0	TCZ-1	TZ03	NP0K-010		5TCCB-V1	
C22	1000			BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C23	1000			BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C24	800			BPD-0008	DD-801	K069	801-001	DC-521	5HK-D1	
C25	800			BPD-0008	DD-801	K069	801-001	DC-521	5HK-D1	
C26	10			SI10NP0	TCZ-10		NP0K-100	ZT-541	5TCC-Q1	
C27	150									
C28	7.5									
C29	1000			BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C30A	5000		V-9044-1	BPD-2X005	DD2-502	DK079	811-005	DC-525	5HK-2D5	
B	5000						811-005	DC-525		
C31	5000		V-5596	BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C32	22			SI22NP0	TCZ-22	TZ14	NP0K-220	ZT-5422	5TCC-Q22	
C33	22			SI22NP0	TCZ-22	TZ14	NP0K-220	ZT-5422	5TCC-Q22	
C34	5000		V-5596-1	BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C35	2.2		V-5658-14	SI2.2NP0	TCZ-2.2	TZ05	NP0K-2R2		5TCCB-V22	
C36	68		R1CC20S2L680K	SI68NP0	TCZ-68	TZ26	NP0L-680	ZT-5468	5TCC-Q68	
C37	.02	600	RCP10M6203M	P688-02	DF-203	CUB6S2	817-02	PT612	6TM-S2	
C38	.01	600	RCP10M6103M	P688-01	D6-103	CUB6S1	GP2-333-103	PT611	6TM-S1	
C39	5000		V-5596-1	BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C40	800		V-9863-1	BPD-0008	DD-801	K069	801-001	DC-521	5HK-D1	
C41	5000		V-5596	BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C42	800		V-9863-1	BPD-0008	DD-801	K069	801-001	DC-521	5HK-D1	
C43	800		V-9863-1	BPD-0008	DD-801	K069	801-001	DC-521	5HK-D1	
C44	2.2		V-5658-2	SI2.2NP0	TCZ-2.2	TZ05	NP0K-2R2		5TCCB-V22	
C45	47		R1CC20S2L470K	SI47NP0	TCZ-47	TZ22	NP0K-470	ZT-5447	5TCC-Q47	
C46	800		V-9863-1	BPD-0008	DD-801	K069	801-001	DC-521	5HK-D1	
C47	800		V-9863-1	BPD-0008	DD-801	K069	801-001	DC-521	5HK-D1	
C48	.47		V-5658-11		TCZ-.5	TZ01				
C49	800		V-9863-1	BPD-0008	DD-801	K069	801-001	DC-521	5HK-D1	
C50	800		V-9863-1	BPD-0008	DD-801	K069	801-001	DC-521	5HK-D1	
C51	800		V-9863-1	BPD-0008	DD-801	K069	801-001	DC-521	5HK-D1	

PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

PARTS LIST & DESCRIPTION (continued)

CAPACITORS (cont)

ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA WESTINGHOUSE PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C53	470	500	RCM30B471K	1469-0005		SR5T47		MCB245	MS-35	
C53	7		V-5658-12	HR.8NP0	TC2-8.8	T208	NP0K-8R8	ZT-5568	5TCCB-V68	
C54	56	500	RCM20B560K			5R5Q56				
C55	.1	600	RCP10M410M	P688-1	DF-104	CUB4P1		PT401	6TM-P1	
C56	.03	600	RCP10M6303M	P688-03	DF-303	CUB6S3	417-02	PT613	6TM-S2	
C57	5000		V-5596-1		BPD-005	DD-502	K060	811-005	DC-525	5HK-D5
C58	270	500	RCM20S271K			5R5T27				
C59	.1	400	RCP10W4104M	P488-1	DF-104	CUB4P1		PT401	4TM-P1	
C60	5000		V-5596-1		BPD-008	DD-502	K060	811-006	DC-525	5HK-D5
C61	.25	400	RCP10W4254M	P488-25		CUB4P25			PT425	4TM-P25
C62	.1	400	RCP10W4104M	P488-1	DF-104	CUB4P1		PT401	4TM-P1	
C63	5		V-9226-3		H5NP0	TC2-4.7	T20T	NP0K-050	ZT-565	5TCCB-V47
C64	150	500	RCM20B151K	1469-00015			5R5T15		MCB236	
C65	2000		RCC32G75Y203M	BPD-002	DD-302		K075	811-002	DC-523	5HK-D2
C66	5000		V-5596-1		BPD-005	DD-502	K060	811-006	DC-525	5HK-D5
C67	5000		V-5596-1		BPD-005	DD-502	K060	811-008	DC-525	5HK-D5
C68	5000		V-5596-1		BPD-005	DD-502	K060	811-006	DC-525	5HK-D5
C69	47	500	RCM20B470K	1469-00006			5R5Q47		MCB235	MS-45
C70	47	500	RCM30B470K	1469-00006			5R5Q47		MCB235	MS-45
C71A	5000		V-9044-1		BPD-2K005	DD2-502	DK079	811-005	DD2-525	5HK-D5
B	5000							811-005		
C72	1500		RCC32G5Y152M	BPD-0015		DD-152	K071	801-0015	DC-5215	5HK-D15
C73	5000		V-5596-1		BPD-005	DD-502	K060	811-005	DC-525	5HK-D5
C74	.03	600	RCP10M6303M	P688-02		DF-303	CUB6S2	417-02	PT613	6TM-S2
C75	.005	600	RCP10M6503M	P688-005		DF-503	CUB6S5	GP2-333-502	PT625	6TM-D5
C76	.01	600	RCP10M6103M	P688-01		DF-103	CUB6S1	GP2-333-103	PT611	6TM-S1
C77	.005	600	RCP10M6502M	P688-005		D6-502	CUB6D5	GP2-333-502	PT625	6TM-D5
C78	5000		V-5596-1		BPD-005	DD-502	K060	811-005	DC-525	5HK-D5
C79	.01	600	RCP10M6103M	P688-01		D6-103	CUB6S1	GP2-333-103	PT611	6TM-S1
C80	270	500	RCM20B271K				5R5T27			
C81	.1	400	RCP10W4104M	P488-1		DF-104	CUB4P1		PT401	4TM-P1
C83	47		RCM20B470K	5247		D6-470	TP2S	GP1K-470	UC-5447	5GA-Q47
C83A	.01						CUB6S1	GP2-333-103	PT611	6TM-S1
B	.002		▲V-11193-1	▲PA-111		▲PC-101	CUB6D2	GP2-333-202	PT622	6TM-D2
C	.005						CUB6D5	GP2-333-502	PT625	6TM-D5
D	.005						CUB6D5	GP2-333-502	PT625	6TM-D5
C84	.01	600	RCP10M6103K	P688-01		D6-103	CUB6S1	GP2-333-103	PT611	6TM-S1
C85	.01	600	RCP10W6103M	P688-05		DF-503			PT415	4TM-S5
C86	.15	400	RCP10W4154K	P488-15			CUB4P15		PT4015	4TM-P15
C87	.1	400	RCP10W4104M	P488-1		DF-104	CUB4P1		PT401	4TM-P1
C88	.1	600	RCP10M6104M	P688-1		DF-104	CUB6P1		PT601	6TM-P1
C89	150	500	RCM20B151K	1468-00015		D6-151	5W5T15	GP2K-151	MC336	1FM-315
C90	100	500	RCM20B101K	1469-0001			5R5T1		MCB235	MS-31
C91	390	500	RCM20S391K	1469-0004			5R5T39		MCB343	MS-34
C92	680	500	RCM20B681K	1479-0007			5R5T68			MS-37
C93	.01	600	RCP10M6103M	P686-01		D6-103	CUB6S1	GP2-333-103	PT611	6TM-S1
C94	.005	600	RCP10M6502M	P688-005		D6-502	CUB6S5	GP2-333-502	PT625	6TM-D5
C95	.01	600	RCP10M6103M	P688-01		D6-103	CUB6S1	GP2-333-103	PT611	6TM-S1
C96	.1	400	RCP10W4104M	P488-1		DF-104	CUB4P1		PT401	4TM-P1
C97	5000	500	RCM30C392K	1464-004			5R5D39		MS-34	
C98	.1	400	RCP10W4104M	P488-1		DF-104	CUB4P1		PT401	4TM-P1
C99	100	500	RCM20B101K	1469-0001			5R5T1		MCB235	MS-31
C100	100	500	RCM20B101K	1469-0001			5R5T1		MCB235	MS-31
C101	.1	400	RCP10W4104M	P488-1		DF-104	CUB4P1		PT401	4TM-P1
C102	390	500	RCM20S391K	1469-0004			5R5T39		MCB343	MS-34
C103	.25	400	RCP10W4254M	P488-25			CUB4P25		PT4025	4TM-P25
C104	.01	600	RCP10M6103M	P688-01		D6-103	CUB6S1	GP2-333-103	PT611	6TM-S1
C105	.1	600	RCP10M6104M	P688-1		DF-104	CUB6P1		PT601	6TM-P1
C106	.05	600	RCP10M6503M	P688-05		DF-503	CUB6S5		PT615	6TM-S5
C107	.05	600	RCP10M0503M	P688-05		DF-503	CUB6S5		PT615	6TM-S5
C108	.25	400	RCP10M4254M	P488-25			CUB4P25		PT4025	4TM-P25
C109	500	30000	V-12099-1			TV8-503	MMU30075			
C110	100		V-9792-1010LJ							
C111	.01	600	V-5046-15	6892X-01		D6-103	CUB6S1	GP2-333-103	PT611	6TM-S1
C112	.01	600	V-5046-15	6892X-01		D6-103	CUB6S1	GP2-333-103	PT611	6TM-S1

Note 1. Not used in all Models.
♦ Items C83A, C83B, C83C, C83D, R85A, R85B, R85C, R85D are combined in one unit.

CONTROLS

ITEM No	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA Westinghouse PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	1500Ω	½	V-9877M-7	*QJ-519	RTV-455			Contrast - Panel
B	500KΩ	½						Volume & switch tapped ④
								40KΩ-rear
R2A	1Meg	½	V-11636C-2	Q13-137	A47-1Meg-Z	AB-70	U-53	Tone
B	Shaft		Not Req.	Not Req.	KSS-3	AK-4	Not Req.	Attach to R2A
R3A	60KΩ	½	V11538-3	Q11-128	A47-50K-B	AB-51	U-41	Horiz. Hold
B	Shaft		Not Req.	Not Req.	KSS-3	AK-4	Not Req.	Attach to R3A
R4A	750KΩ	½	V-11539-2	QU-136	A47-1Meg-S	AB-69	U-54	Vert. Hold
B	Shaft		Not Req.	Not Req.	KSS-3	AK-4	Not Req.	Attach to R4A
R5A	100KΩ	½	V-11536D-2	Q11-128	A47-100K-S	AB-60	U-41	Brightness
B	Shaft		Not Req.	Not Req.	KSS-3	AK-4	Not Req.	Attach to R5A
R6A	800Ω	3	V-11214-1		RTV-326			Focus - wire wound Note
B	800Ω	3						
R7A	1500Ω	2	V-5591C-2	WK-1500	A43-1500	VK-130	R1500L	Vert. Linearity-wire wound
B	Shaft		Not Req.	Not Req.	FKS-1/4	Not Req.	Not Req.	Attach to R7A
R8A	250KΩ	½	V-9813-4	Q11-130	A47-250K-S	AB-50	SU-46	Height
B	Shaft		Not Req.	Not Req.	FKS-1/4	AK-1	Not Req.	Attach to R8A
R9	500Ω	1	V-11345-2		39-500			Buzz Quieting-wire wound
R10A	500KΩ	½	V-9813G-3	Q11-133	A47-500K-S	AB-59	U-50	AGC
B	Shaft		Not Req.	SQ	KSS-3	AK-1	Not Req.	Attach to R10A

* CONCENTRIKIT EQUIVALENT KIT K-2 BASE ELEMENTS & SHAFTS B1T-109 & P1-310 (Panel) B1S-133X & R3-329 (Rear) & SWITCH T6-1.

Note. Some models may use a single 400Ω control in this application.

RESISTORS

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA Westinghouse PART No.	IRC PART No.	NOTES
R11	15KΩ	½		BTS-15K	
R12	1Meg 5%	½		BTS-1Meg 5%	
R13	750KΩ 5%	½		BTS-750K 5%	
R14	150KΩ	½		BTS-150K	
R15	150KΩ	½		BTS-150K	
R16	3900Ω	½		BTS-3900	
R17	1000Ω	½		BTS-1000	
R18	220KΩ	½		BTS-220K	
R19	2200Ω	½		BTS-2200	
R20	2300Ω	½		BTS-2300	
R21	15KΩ	½		BTS-15K	
R22	22Ω	½		BTS-22	
R23	4700Ω	½		BTS-4700	
R24	1000Ω	½		BTS-1000	
R25	470Ω	½		BTS-470	
R26	150Ω	½	RC30AE151M	BTS-150	
R27	3300Ω	2	RC40AE332K	BTS-3300	
R28	1800Ω	1	RC30AE182M	BTS-1800	
R29	18Meg 5%	½	RC20AE185J	BTS-18Meg 5%	
R30	1.5Meg 5%	½	RC30AE155J	BTS-1.5Meg 5%	
R31	390KΩ	½	RC30AE394K	BTS-390K	
R32	10KΩ	½	V-9927-10	BTS-10K	
R33	10Ω	½	RC20AE100M		
R34	68Ω	½	RC20AE680K	BTS-68	
R35	560Ω	½	RC20AE471M	BTS-470	
R36	470Ω	½	RC20AE471M	BTS-470	
R37	100KΩ	½	RC20AE104K	BTS-100K	
R38	470Ω 5%	½	RC30AE103M	BTS-10K	
R39	68Ω	½	V-9927-2	BTS-4700 5%	
R40	470Ω	½	RC20AE680K	BTS-68	
R41	470Ω 5%	½	RC30AE471M	BTS-470	
R42	150Ω	½	V-9927-2	BTS-4700 5%	
R43	470Ω	½	RC20AE471K	BTS-470	
R44	220Ω	½	RC20AE221K	BTS-220	
R45	3300Ω	½	RC20AE332K	BTS-3300	
R46	12KΩ	½	RC30AE123K	BTS-12K	
R47	10Ω	½	RC30AE100M	BTS-10	
R48	6800Ω	½	RC20AE682K	BTS-6800	
R49	3900Ω	10	V-5924-3		
R50	330KΩ	½	RC20AE334K	BTS-330K	
R51	330KΩ	½	RC30AE334K	BTS-330K	
R52	1.5Meg	½	RC30AE155K	BTS-1.5Meg	
R53	100KΩ	½	RC30AE104K	BTS-100K	
R54	330KΩ	½	RC30AE332K	BTS-330K	
R55	1500 Ω	½	RC20AE152K	BTS-1500	
R56	18KΩ	2	RC40AE183K	BTS-18K	
R57	1200	1	RC30AE472K	BTA-4700	
R58	3000Ω	20	V-9375-4	2D-3000	
R59	4700Ω	2	RC20AE472K	BTS-4700	
R60	120Ω	1	RC30AE121K	BTS-120	
R61	1200Ω	2	RC20AE122K	BTS-1200	
R62	27KΩ	2	RC40AE273K	BTS-27K	
R63	470Ω	2	RC40AE471M		
R64	330KΩ	2	RC40AE334K	BTS-330K	
R65	12KΩ	2	RC40AE123K	BTS-12K	
R66	10KΩ	2	RC40AE103M	BTS-10K	
R67	150Ω	2	RC20AE151K		
R68	180Ω	2	RC20AE181K	BTS-180	

Note 1. Some models may use a 2200Ω resistor in this application.
Note 2. Some models may use a 18KΩ resistor in this application.
Note 3. Some models may use a 680Ω resistor in this application.
Note 4. Some models may use a single 33Ω (1 watt) resistor in this application.
♦ Items R85A, R85B, R85C, R85D, C83A, C83B, C83C, C83D are combined in one unit.

TRANSFORMER (POWER)

ITEM No.	RATING PRI	RATING SEC. 1	RATING SEC. 2	REPLACEMENT DATA Westinghouse PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	RCA TYPE No.	Halldorson PART No.	Thordorson PART No.
T1	117VAC @ 2.5A	680VCT @ 200ADC	5VAC @ 6A	V-11544-1						
	SEC. 3	SEC. 4	SEC. 5							
	12.6VCT @ 7.1A									

TRANSFORMERS (SWEEP CIRCUITS)

ITEM No	USE	REPLACEMENT DATA Westinghouse PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	RCA TYPE No.	Halldorson PART No.	Thordorson PART No.
T2	Horiz. Output Trans.	V-12073-1			*D-50 & WC-11	*2357L & 214R1		
T3	Vert. Output Trans.	V-6981-5	A-8143	A-3038	A-99X		Z1802	T-26853
T4A	Yoke (90)-Horiz. (21Mh)	V-12072-1 ②			①			
B	Yoke (90) - Vert. (36Mh)							
T5	Focus Coil	V-9253-5	FC-1①	MF-2①	B-470-R ①		EM701 ①	FC-3 ①
		V-9253-4 ④						
T6	Horiz. Lin. Coil (1.8-10MH)	V-12102-1	WC-8⑤	MWC-6⑤	WC-12⑤ ⑥	212R1⑤		WC-17⑤
T7	Width Coil (1.7-10MH)	V-12103-1		MWC-6⑤	WC-12⑤ ⑥	212R1⑤		

① Drill new mounting holes.
② If AGC fails to operate properly, reverse primary (or secondary) of width coil.
③ Includes plug (part #V-6762).
④ Alternate focus coil.
⑤ Drill new mounting hole or use original slider and core.
⑥ Connect to coded red and blue terminals.

*HORIZONTAL OUTPUT TRANSFORMER CONNECTION DATA

Use Original Width Coil Unless Replacement Type Is Listed

ORIGINAL TERMINAL CONNECTIONS	Stancor Replacement Connections	Merit Replacement Connections	Triad Replacement Connections	RCA Replacement Connections	Halldorson Replacement Connections	Thordorson Replacement Connections
Horiz. Output Plate			9	9		
4			7	7		
3 (NC)			NC	NC		
8			3	3		
7			1	1		
5			WC-11 (Black term)	214R1 (term. D)		
6			WC-11 (Orange term.)	214R1 (term. C)		
Connect Width Coil Across	8 & 7		WC-11 (Red & Blue term)	214R1 (terms A & B)		
			3 & 1	3 & 1		
Special Notes			①②	① ②		

TRANSFORMER (AUDIO OUTPUT)

ITEM No	IMPEDANCE PRI	IMPEDANCE SEC	REPLACEMENT DATA WESTINGHOUSE PART No	Stancor PART No	Merit PART No	Triad PART No	Halldorson PART No	Thordorson PART No	NOTES
T8	7.1KΩ	3.4Ω	V-9238-1	A-3878	A-2931	S-7X	Z1000	TS-24560	

SPEAKER

ITEM No.	RATINGS SIZE	RATINGS FIELD	RATINGS V. C. IMP.	REPLACEMENT DATA WESTINGHOUSE PART No	VIKING PART No	QUAM PART No.	NOTES
SP1A	6"	PM	3.4Ω	V-12143-1	5J4	6A1	↓ Alternate 10" PM speaker.
B	10"	PM	3.4Ω	V-9770-1 ①	10J11	10A31	

COILS (RF-IF)

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA Westinghouse PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	NOTES
L1	Ant.Trans.	00CT	00CT					
L2	Ant. Coils	0Ω						
L3	Ant. Coil	0Ω						Channel 13
L4	UHF Coil	0Ω						
L5	UHF Coil	0Ω						Channel 13
L6	Neutr.Coil	0Ω						
L7	RF Coil	0Ω						
L8	RF Coils	0Ω						
L9	Mixer Grid Coil	0Ω						Channel 13
L10	Mixer Grid Coils	0Ω						
L11	Fil. Choke	0Ω						
L12	Osc. Coils	0Ω						
L13	Osc. Coil	0Ω						Channel 6
L14	Osc.Plate Coil	0Ω CT						Channel 13
L15	Conv.Plate	.1Ω						
L16	1st.Video IF	0Ω		V-9883-7	17-4634 †		6219 †	
L17	41.25MC Trap	0Ω		V-11973-1				
L18	Fil. Choke	0Ω		V-4886-3	19-1000	TV-189	4602	1.1 Microhenries
L19	Fil. Choke	0Ω		V-4886-2	19-1000	TV-189	4602	1.1 Microhenries
L20	2nd.Video IF	.6Ω	.5Ω	V-9879	17-4531 *		6231	
L21	47.25MC Trap	0Ω		V-11973-1	30-1047			
L22	3rd.Video IF	.6Ω	.5Ω	V-9879	17-4531 *		6231	
L23	4th.Video IF	.5Ω		V-12128-1				Includes crystal detector, capacitors, & (4 Microhenries series peaking coil (part #V-4886-1)
L24	Fil. Choke	0Ω		V-4886-2	19-1000	TV-189	4602	1.1 Microhenries
L25	Series Peaking Coil	4.2Ω		V-9915-1	19-3093	TV-181	6177	100 Microhenries
L26	Shunt Peaking Coil	1.3Ω		V-4886-1	19-1005	TV-180	4634	14 Microhenries
L27	Fil. Choke	0Ω		V-4886-2	19-1000	TV-189	4602	1.1 Microhenries
L28	4.5MC Trap	1.2Ω		V-9883-3	30-1004	TV-181	6170	
L29	Series Peaking Coil	5.5Ω		V-5902-1	19-3125	TV-184	6644	140 Microhenries
L30	Shunt Peaking Coil	13Ω		V-5902-5	19-3250	TV-186	6181	250 Microhenries
L31	Series Peaking Coil	1.3Ω		V-4886-1	19-1005	TV-180	4634	14 Microhenries
L32	1st.Sound IF	.35Ω		V-9882-5	17-3400	TV-181	1470	
L33	2nd.Sound IF	1.7Ω		V-9883-3	20-1006	TV-181	1469	
L34	RF Choke	15Ω		V-9915-2	19-3300		4648	350 Microhenries
L35	Fil. Choke	0Ω		V-4886-3	19-1000	TV-189	4602	1.1 Microhenries
L36	Quadrature Coil	6Ω		V-11396-1	17-1031		1470-A	
L37	Horiz.Osc.	85Ω		V-6764	19-1576	TV-183	6210	
L38	RF Choke	3Ω		V-9883-2	19-1003		4606	3.3 Microhenries, IRC part #CLA
L39	RF Choke	3Ω		V-9883-3	19-1003		4606	3.3 Microhenries IRC part #CLA
L40	Fil. Choke	2.2Ω		V-9099-5	19-1002		4606	2.7 Microhenries IRC part #CLA

† Use one winding only.
* Detune trap.

WESTINGHOUSE MODELS H-795T27, H-795TU27, H-815T24, H-815TU24, H-817K24, H-817TK24 (Ch. V-2250-1)

PARTS LIST & DESCRIPTION (continued)

FILTER CHOKE

ITEM No.	RATINGS			REPLACEMENT DATA					
	TOTAL DIRECT CURRENT	D. C. RESISTANCE	INDUCTANCE (0 CURRENT 1000 ∿)	WESTINGHOUSE PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.
L41	.290A	41Ω	1.15HY	V-12170-1	C-2326 ①	C-2996 ①	C-17X ①	C5037 ①	T-26C44

① Drill one new mounting hole.

FUSES

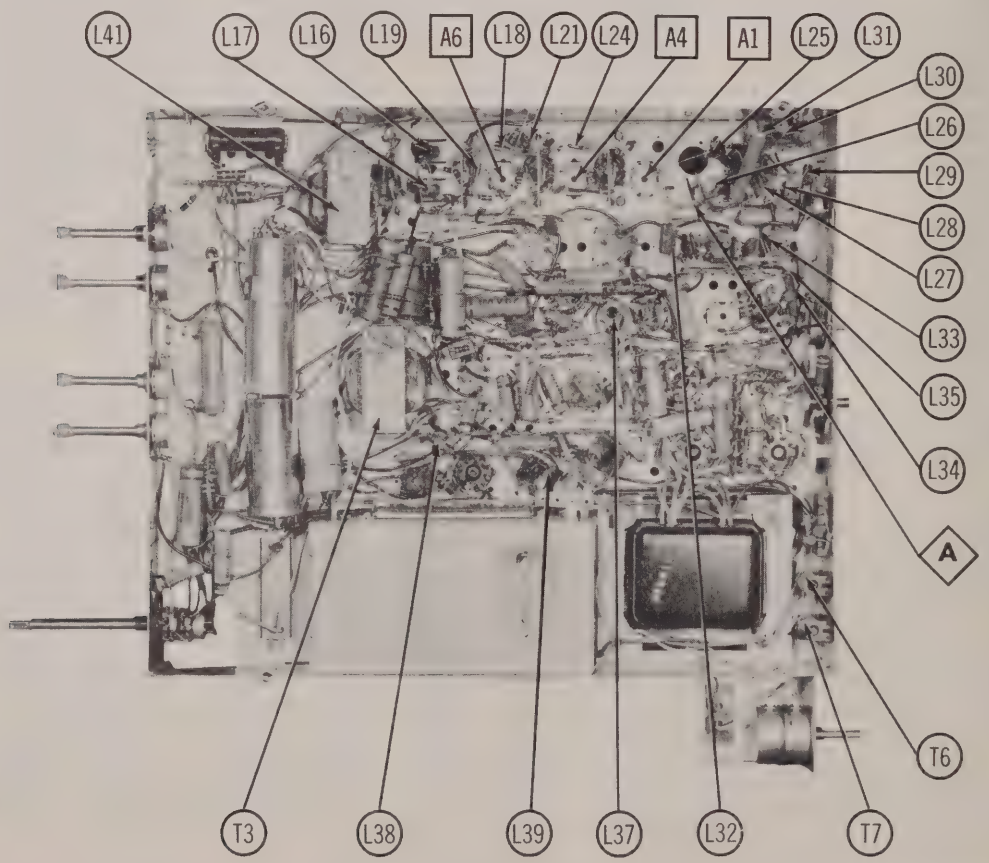
ITEM No.	TYPE	RATING	REPLACEMENT DATA					
			WESTINGHOUSE PART No.		LITTELFUSE PART No.		BUSS PART No.	
			FUSE	HOLDER	FUSE	HOLDER	FUSE	HOLDER
M1	3AG	3/8A 250V	V-6170-10	V-11966-1	312.375 (3AG-3/8A)	357001	AGC 3/8	4405

CRYSTAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA			NOTES
		WESTINGHOUSE PART No.	SYLVANIA PART No.	FEDERAL PART No.	
M2	CK-706 or 1N64	V-10916-1	1N132	1N64A	Video detector

MISCELLANEOUS

ITEM No.	PART NAME	WESTINGHOUSE PART No.	NOTES
M3	Dial light		# 47
M4	Tuner	V-11794-1	VHF
M5	Tuner	V-12325-1	UHF
M6	Detector	V-12128-1	Video assembly (includes crystal diode)
M7	Ion trap	V-9784-6	
M8	Correction magnet	V-12440-1	2 used
B1	Trimmer cap		Horiz. Range (5-80MMF)
	Cabinet	V-1332-1	Model H-815T24 & TU24
	Cabinet	V-1333-1	Model H-817K24 & KU24
	Cabinet	V-1316-1	Model H-795T27 & TU27
	Knob	V-12118-1	Assembly, 16 Pos.
	Knob	V-11962-1	UHF
	Knob	V-11980-1	Off-on volume (All Models
	Knob	V-11979-1	Picture
	Knob	V-11963-1	Fine tuning
	Safety glass	V-11918-3	Models H-815T24 & K24
	Safety glass	V-12368-1	Model H-795T27



CHASSIS BOTTOM VIEW-TRANS., INDUCTOR & ALIGN. IDENTIFICATION

TROUBLE SHOOTING AIDS (cont)

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3924 MEADE ST.
DENVER, COLORADO

POWER

DEAD SET

If filaments fail to light, check AC interlock assembly, switch on volume control and T1. If filaments light, substitute V22 and V23. Check B+ filter and decoupling network components.

SMALL AND/OR DIM PICTURE

Check B+ filter and decoupling network components including T1, L41, C1A and C1B.

HIGH VOLTAGE

LOSS OF HIGH VOLTAGE

Check fuse M1. Check by substitution V17, V18, V19, V20 and V21. Check waveform W15.

If Satisfactory	If Unsatisfactory
Check T4A, T2, C109, R121, R118, C105 and other associated components.	Check C104, R114, R110, R111, R106, C97, C98, C99, C100 and other associated circuit components.

INSUFFICIENT HIGH VOLTAGE

Check by substitution V17, V18, V19, V20, V21, V22 and V23. Check picture tube. Proceed as outlined under "Loss of High Voltage".

BLOOMING

Check by substitution V17, V18, V19, V20, V21, V22 and V23. Check C109, R121, T2, T4A, R118, C105, picture tube and other associated circuit components.

GENERAL

RASTER PICTURE NO SOUND

Follow procedure outlined under "Weak or No Sound".

RASTER SOUND NO PICTURE

Follow procedure outlined under "Loss of Video".

RASTER NO SOUND NO PICTURE

Check by substitution V1, V2, V3, V4 and V5. Check video detector crystal and assembly. Check video IF and tuner components.

NO RASTER NO SOUND

Follow procedure outlined under "Dead Set".

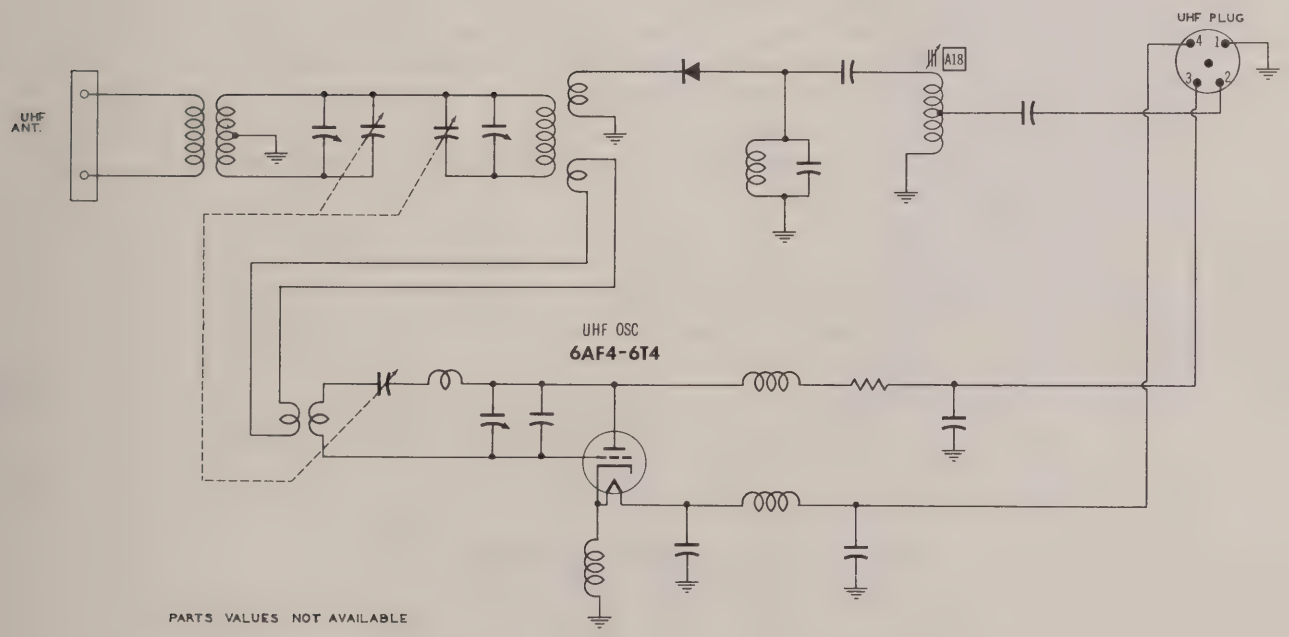
KEYSTONE EFFECT

Check T4, C110, R97, R98 and R99.

INTERMITTENT STREAKS

Check high voltage section for corona discharge and arcing.

Symptoms shown are assumed and are not indicative of the quality and workmanship of this equipment.



MODEL H-804 UHF TUNER (PART NO. V-12325-1) USED IN SOME MODELS

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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UHF TUNER SCHEMATIC

SERVICING IN THE FIELD

TUNER OSCILLATOR ADJUSTMENTS

Touch-up adjustments of the VHF tuner oscillator circuit may be accomplished by removing the channel selector and fine tuning knobs.

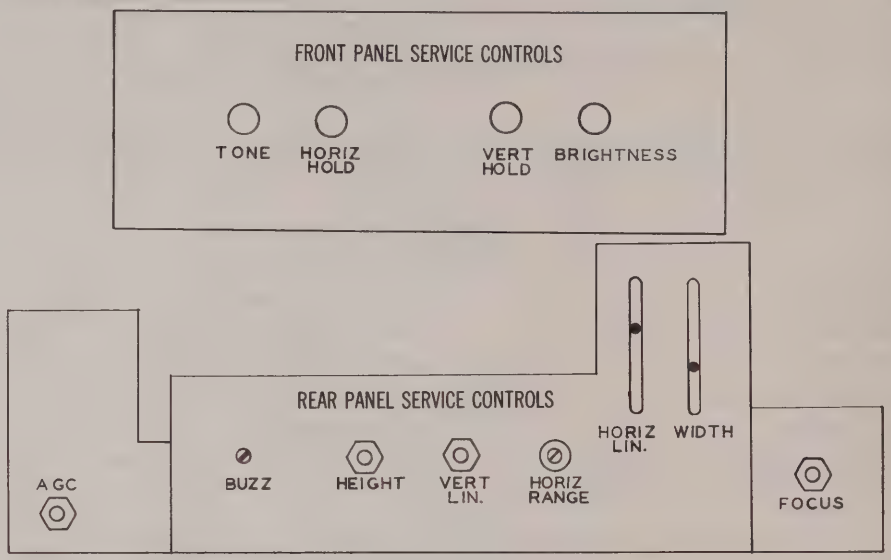
PICTURE TUBE SAFETY GLASS CLEANING

For picture tube safety glass cleaning, it is necessary to remove the chassis. (See disassembly instructions).

PICTURE TUBE REMOVAL

For picture removal it is necessary to remove chassis. (See disassembly instructions).

SERVICE ADJUSTMENT LOCATION



SPECIAL ADJUSTMENTS - AGC CONTROL

Tune in the strongest TV signal available and turn the AGC control clockwise until picture just begins to overload then back off control until no evidence of overload remains.

HORIZONTAL OSCILLATOR FIELD ADJUSTMENT

For adjustment of the horizontal oscillator, it is necessary to remove the rear cover and supply power to set. Adjustment is located on top of chassis. Set the horizontal hold control at the center of its range and adjust the horizontal frequency slug (L37) until picture synchronizes horizontally. (For location see tube placement chart).

SOUND IF DETECTOR BUZZ ADJUSTMENT

Adjust the buzz control located on rear apron of chassis for maximum volume and minimum buzz. If results are unsatisfactory see alignment instructions on pages 6 and 7.

FUSES

One fuse is used for horizontal sweep circuit protection. (For location, see tube placement chart).

CENTERING

Centering is accomplished mechanically by positioning the focus coil. Adjust the three nuts located on the focus coil bracket until picture is properly centered.

ANTI-PIN CUSHION ADJUSTMENT

Reduce the size of the raster until the sides become visible. Adjust the anti-pin cushion magnets until the opposite sides are straight and parallel. Restore the picture to normal size.

DISASSEMBLY INSTRUCTIONS

1. Remove 4 push-on type control knobs from front panel.
2. Disconnect built-in antenna and transmission lines.
3. Remove 8 wood screws. Remove rear cover.
4. Disconnect speaker leads, yoke plug, focus coil plug, CRT socket and HV plug.
5. Remove ground from chassis to CRT.
6. Remove 6 chassis bolts. Remove chassis.
7. Remove 2 speaker nuts. Remove speaker.

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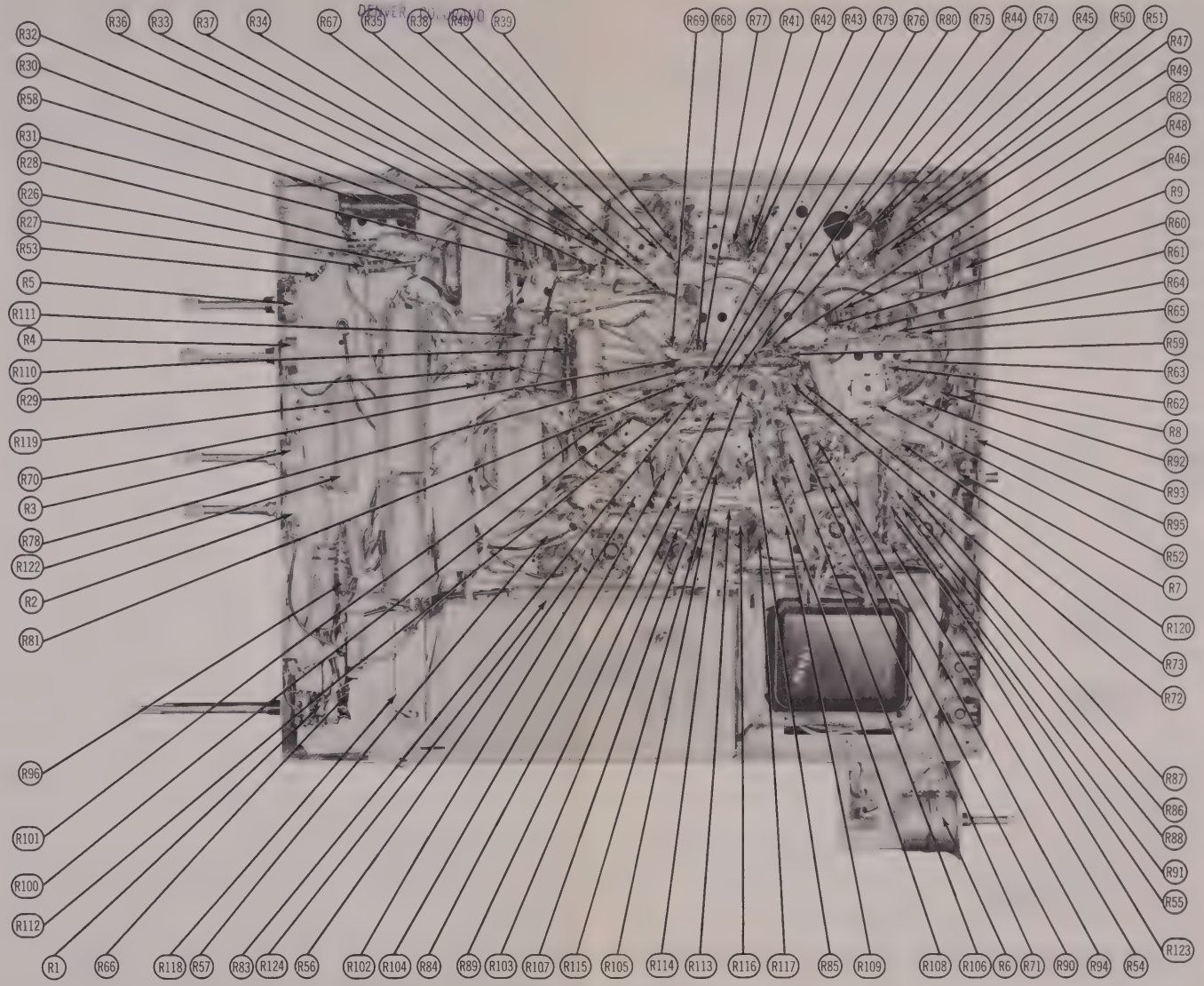
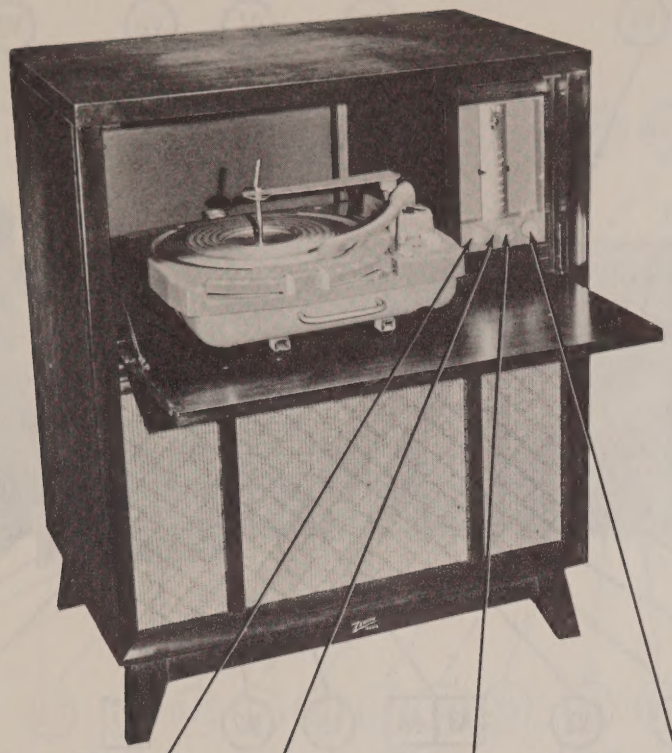
DENVER, COLORADO



CHASSIS BOTTOM VIEW-RESISTOR IDENTIFICATION

ZENITH
MODELS L677E, R (Ch. 6L20)



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DENVER, COLORADO

ZENITH
MODELS L677E, R (Ch. 6L20)

TRADE NAME	Zenith Model L677E, R (Ch. 6L20)
MANUFACTURER	Zenith Radio Corp., 6001 Dickens Ave., Chicago, Ill.
TYPE SET	AC Operated Radio-Phono Combination Superheterodyne Receiver with Automatic Record Changer
TUBES (Six)	Types 6BA6 RF Amp., 6BE6 Conv., 6BA6 IF Amp., 6AT6 Det.-AVC-AF Amp., 25L6GT Audio Output, 25Z6GT Rectifier
POWER SUPPLY	110-120 Volts AC-60 Cycles — RATING .42 Amp. @ 117 Volts AC
TUNING RANGE—BROADCAST	540-1620KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Use isolation transformer, if available. If not, connect a .1MFD capacitor in series with low side of signal generator and B-. Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.
Use Zenith alignment wrench #68-19 or equivalent.
To set pointer, turn tuning capacitor fully closed and set pointer to last reference mark at low frequency end of dial.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.5MFD	High side to pin 7 (grid) of 6BE6 (V2). Low side to B-.	455KC (400~Mod)	600KC	Across voice coil	A1, A2, A3, A4	Adjust for maximum output. If isolation transformer is not used, reduce dummy antenna to .001MFD to reduce hum modulation.
2.		Loop	1620KC	Tuning gang fully open	"	A5	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
3.		"	1400KC	Tune to 1400KC signal	"	A6, A7	"

FOR SERVICE INFORMATION ON ZENITH RECORD CHANGER MODEL S-14054, SEE PHOTOFACT SET 226 - FOLDER 13.

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

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PARTS LIST AND DESCRIPTIONS

ZENITH
MODEL L677E (Ch. 6L20)

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA: ZENITH PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RETMA BASE TYPE	NOTES
V1	RF Amplifier	6BA6	6BA6	7BK	
V2	Converter	6BE6	6BE6	7CH	
V3	IF Amplifier	6BA6	6BA6	7BK	
V4	Det-AVC AF Amp.	6AT6	6AT6	7BT	
V5	Audio Output	25L6GT	25L6GT	7S	
V6	Rectifier	25Z6GT	25Z6GT	7Q	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: ZENITH PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C1A	80	250	22-2391	AFH2-64		B048		FP413X	TVL-2582	
B	40	250								
C2	10	250	22-2390	PRS250/12		BR1025		TC52	TVA-1504	
C3	.05	200	22-829	P288-05	DF-503	PJ2S5		PT415	2TM-S5	
C4	220	500	22-182							
C5	10000		22-3	BPD-01	DD-103	TM5S1	811-01	DC-511	5HK-S1	
C6	.05	200	22-829	P288-05	DF-503	PJ2S5		PT415	2TM-S5	
C7	4000		22-4	BPD-004	DD-402	TM5D4	812-004	DC-524	5HK-D4	
C8	.01	200	22-826	P288-01	D6-103	PJ2S1		PT401	2TM-S1	
C9	10000		22-3	BPD-01	DD-103	TM5D1	811-01	DC-511	5HK-S1	
C10	4000		22-4	BPD-004	DD-402	TM5D4	812-004	DC-524	5HK-D4	
C11	.05	200	22-829	P288-05	DF-503	PJ2S5		PT415	2TM-S5	
C12A	10000									
B	500		*105-27	*PA-112-5	*PC-84					Note 1
C										
C13	.01	600	22-669	P688-01	D6-103	PTE6S1	GP2-333-103	PT611	6TM-S1	
C14	.047	400	22-1775	489ZX-047		PJ4S47		PT4147	4TM-S47	
C15	.05	200	22-829	289ZX-05		PJ2S5		PT415	2TM-S5	
C16	10000			BPD-01	DD-103	TM5S1	811-01	DC-511	5HK-S1	

* Items C12A, C12B, C13C, R15A and R15B are combined in one unit. When replacing items separately, C12B and C12C should total 500MMF.

Note 1. Some Models use a 10000 disc in place of C12A and a 500MMF in place of C12B and C12C.

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: ZENITH PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	1 Meg	½	63-2787	Q13-137	AG-63-Z	BSK-70-S	U-53	Volume
B	Shaft		Not Req.	Not Req.	KSS-3	Not Req.	Not Req.	Attach to R1A
C	Switch		Not Req.	76-1	SWB	Not Req.	US-26	Attach to R1A
R2A	500KΩ	½	63-2788	Q14-133	AG-58-S	AB-61	U-50	Tone
B	Shaft		Not Req.	Not Req.	KSS-3	AK-4	Not Req.	Attach to R2A

RESISTORS

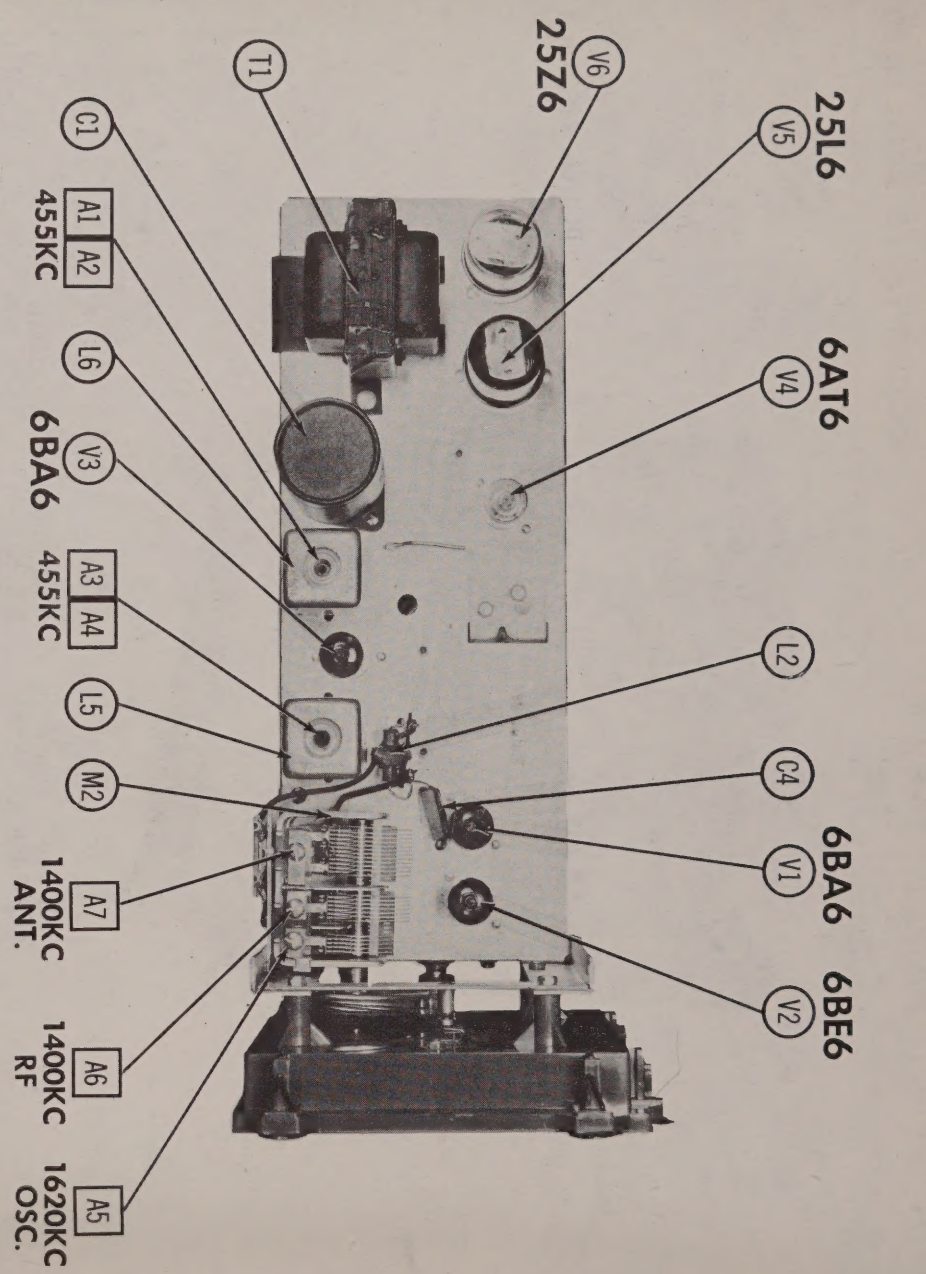
ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: ZENITH PART No.	IRC PART No.	NOTES
R3	1 Meg	½	63-1912	BTS-1 Meg	
R4	330Ω	½	63-1765	BTS-330	
R5	10KΩ	½		BTS-10K	
R6	1000Ω	½	63-1786	BTS-1000	
R7	22KΩ	½	63-1842	BTS-22K	
R8	68Ω	½	63-1736	BTS-68	
R9	82Ω	½	63-1740	BTS-82	
R10	3. 3Meg	½	63-1933	BTS-3. 3Meg	
R11	4. 7 Meg	½	63-1940	BTS-4. 7Meg	
R12	2. 2 Meg	½	63-1926	BTS-2. 2Meg	
R13	1 Meg	½	63-1912	BTS-1 Meg	

ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: ZENITH PART No.	IRC PART No.	NOTES
R14	4. 7 Meg	½	63-1940	BTS-4. 7Meg	
R15A	500KΩ	1	* 105-27		Note 1
B	500KΩ	1			Note 1
R16	120Ω	1	63-1981	BTA-120	
R17	3300Ω	½	63-1806	BTS-3300	
R18	820Ω	½	63-1782	BTS-820	
R19	4700Ω	½	63-1814	BTS-4700	
R20	10KΩ	½	63-1828	BTS-10K	
R21	2200Ω	1	63-949	BTA-2200	
R22	2000Ω	5	63-3151	1 3/4A-2000	
R23	15KΩ	½	63-1834	BTS-15K	

* Items R15A, R15B, C12A C12B, C12C are combined in one unit.

Note 1. Some models may use a 470KΩ resistor in this application.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (POWER)

ITEM No.	RATING				REPLACEMENT DATA					
	PRI.	SEC. 1	SEC. 2	SEC. 3	ZENITH PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.
T1	117VAC @ .42A tap @ 524VCT .045A &6.3VAC @ .3A				95-1356					

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	ZENITH PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.	
T2	3.2KΩ	3.2Ω	95-1300	A-3876 ①	A-3018	S-1X ①	Z1006		① Drill one new mounting hole.

SPEAKER

ITEM No.	RATINGS			REPLACEMENT DATA			NOTES
	SIZE	FIELD	V. C. IMP.	ZENITH PART No.	VIKING PART No.	QUAM PART No.	
SP1	10"	PM	3.2Ω	49-723	10J11	10A31	

COILS (RF-IF)

ITEM No.	USE	DC RES.		REPLACEMENT DATA				NOTES
		PRI.	SEC.	ZENITH PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L1	Loop Ant.			S-18725				
L2	Loop Ant. Loading Coil	3.5Ω		S-18685	19-3180	TV-184	6180	185 Microhenries Sec. tapped @ 5Ω
L3	RF Coil	2.9Ω	11Ω	S-19723				
L4	Osc. Coil	.6Ω	9Ω	S-18682	14-1073		69-Osc. †	
L5	Input IF	22Ω	23Ω	95-1101	16-6666	BC-368	012-C1	
L6	Output IF	20Ω	20Ω	95-1102	16-6770 *	BC-355 *	12-C6 *	

† Drill mounting hole.
* Use adaptor plate & cut out center spade bolt mounting support.

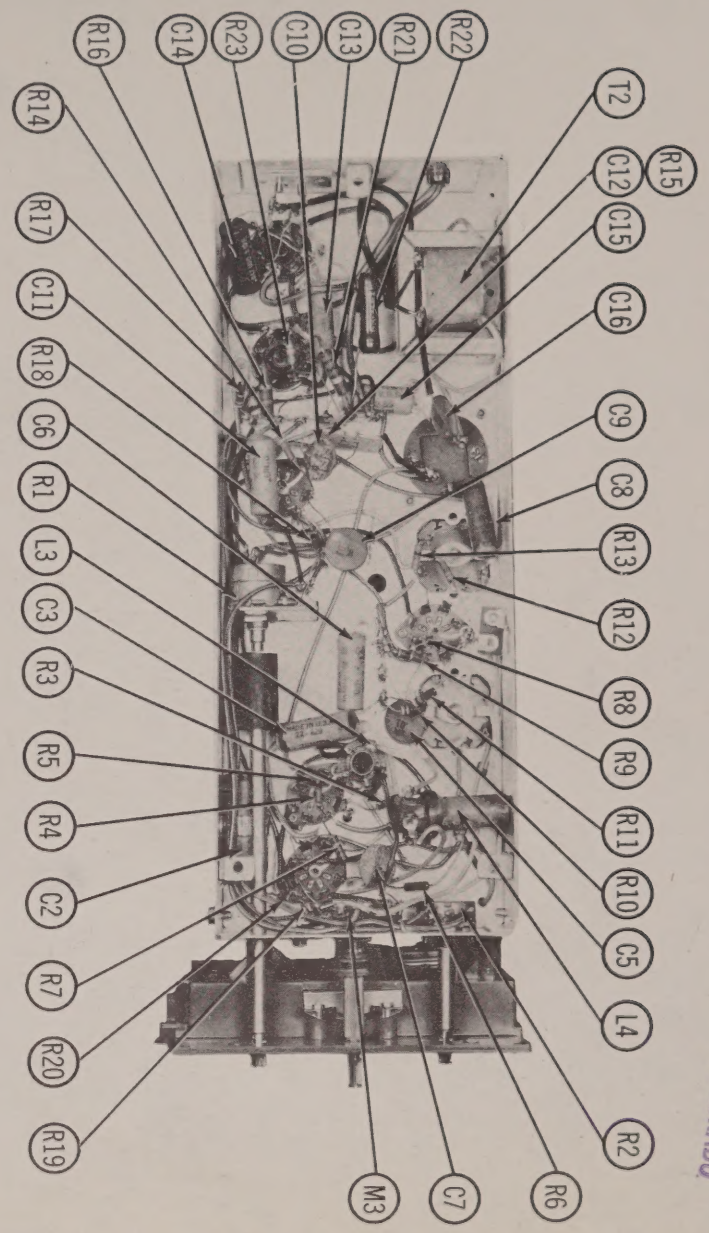
PHONO CARTRIDGE

ITEM No.	REPLACEMENT DATA						REMARKS
	ZENITH PART No.	ASTATIC PART No.		SHURE PART No.		ELECTRO-VOICE PART No.		
		CARTRIDGE	NEEDLE	CARTRIDGE	NEEDLE	CARTRIDGE	NEEDLE	
M1	142-72							

MISCELLANEOUS

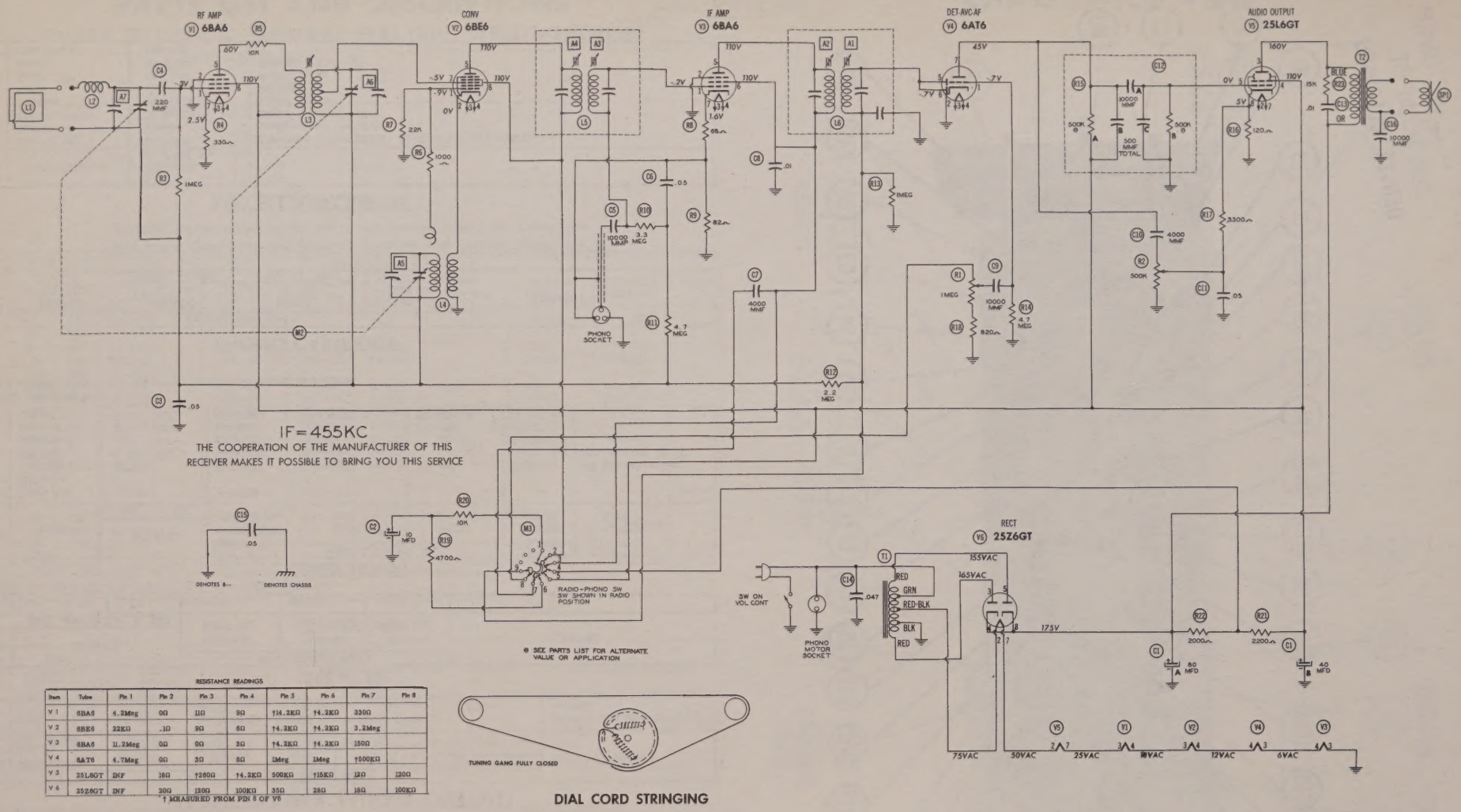
ITEM No.	PART NAME	ZENITH PART No.	NOTES
M2	Tuning cap	22-2392	3 section (37-385MMF) (15-210MMF) (14-92MMF)
M3	Switch	85-519	Radio-phono (rotary)
	Cabinet	14-1450R	Model L677R
	Cabinet	14-1450E	Model L677E
	Knob	46-945	Tuning
	Knob	46-1009	Radio-phono
	Knob	46-1010	Volume & tone (2)
	Dial glass	192-150	

CHASSIS—BOTTOM VIEW



L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

ZENITH
MODEL L677E (Ch. 6L20)



⊕ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
V 1	6BA6	4.2Meg	0Ω	11Ω	9Ω	†4.2KΩ	†4.2KΩ	330Ω	
V 2	6BE6	22KΩ	.1Ω	9Ω	6Ω	†4.2KΩ	†4.2KΩ	3.2Meg	
V 3	6BA6	11.2Meg	0Ω	0Ω	3Ω	†4.2KΩ	†4.2KΩ	150Ω	
V 4	6AT6	4.7Meg	0Ω	3Ω	8Ω	1Meg	1Meg	†800KΩ	
V 5	25L6GT	INF	18Ω	†260Ω	†4.2KΩ	500KΩ	†15KΩ	12Ω	120Ω
V 6	25Z6GT	INF	20Ω	130Ω	100KΩ	35Ω	28Ω	18Ω	100KΩ

† MEASURED FROM PIN 8 OF V6

DIAL CORD STRINGING

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

A PHOTOFACT STANDARD NOTATION SCHEMATIC
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